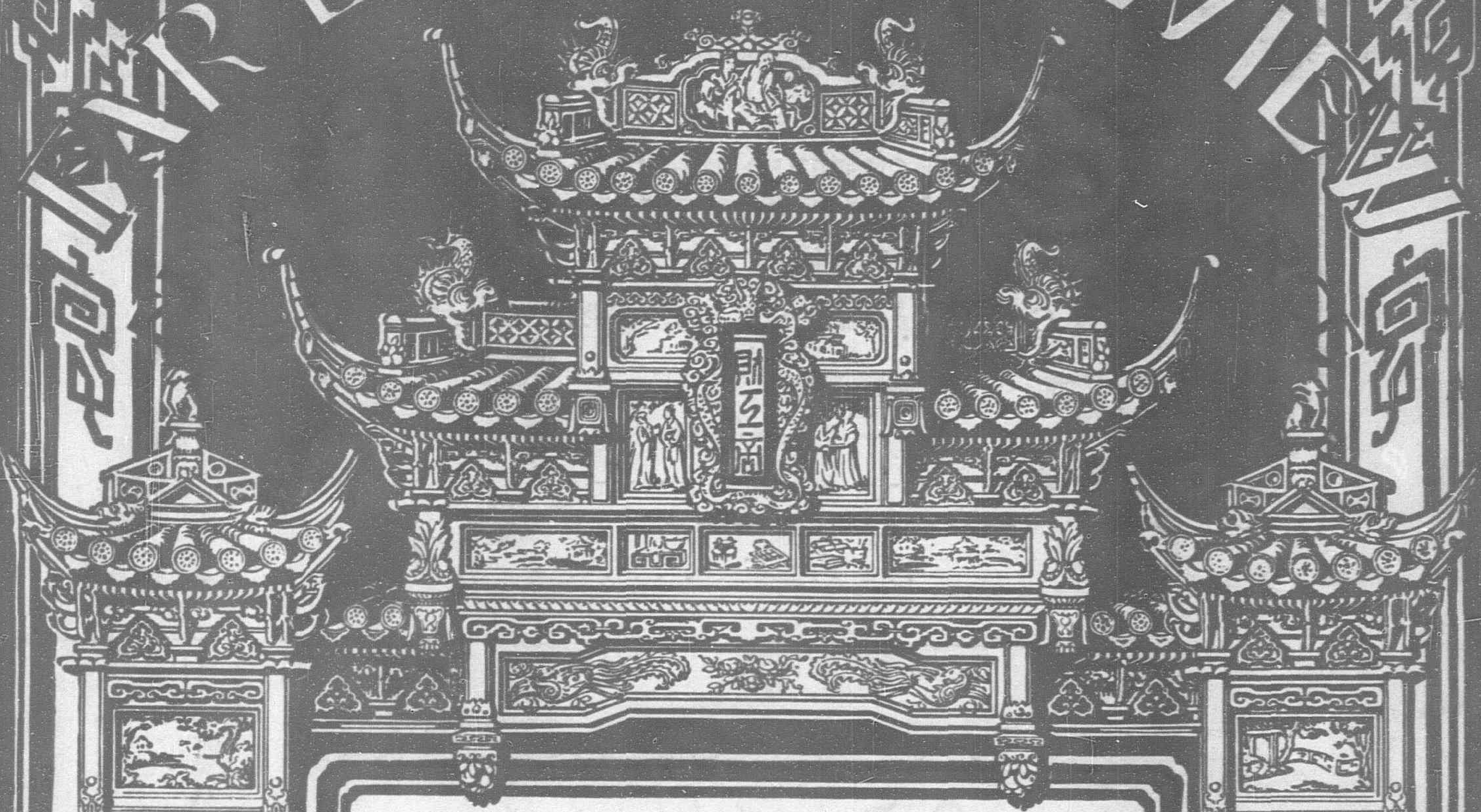
大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW



遠東時報

上海仁記路第五號

A SUPER-EXTRA TERRITORIAL AMERICAN GOVERNMENT IN CHINA

AGAIN, THAT SUPERFLUOUS STATE DEPARTMENT

ANGLO-AMERICAN CO-OPERATION

JAPAN'S MESSAGE TO CHINA

JAPAN'S NAVAL POLICY

DEVELOPMENTS IN THE FAR EASTERN STEEL INDUSTRY

IRON ORE IN THE N.E.I.

PETROLEUM IN THE N.E.I.

MINERAL RESOURCES OF THE ALTAIS

THE CHINESE EASTERN RAILWAY ZONE

Vol. XX

March, 1924

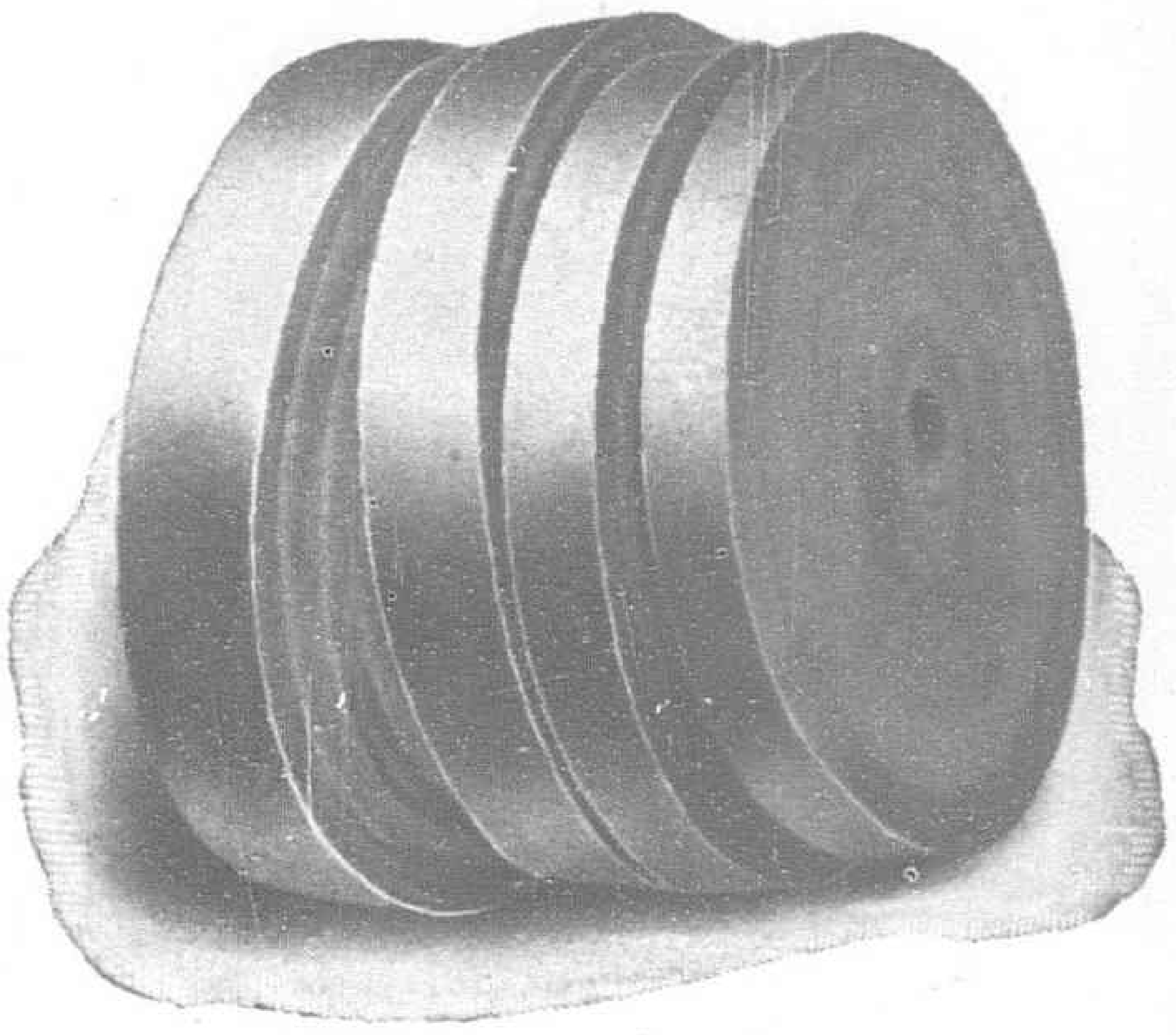
No. 3

UNIVE
26 19
BRAR

13

Ready for Immediate Delivery

STAR BRAND
LEATHER BELTING



Complete Stocks Carried by

THE KOSTER COMPANY

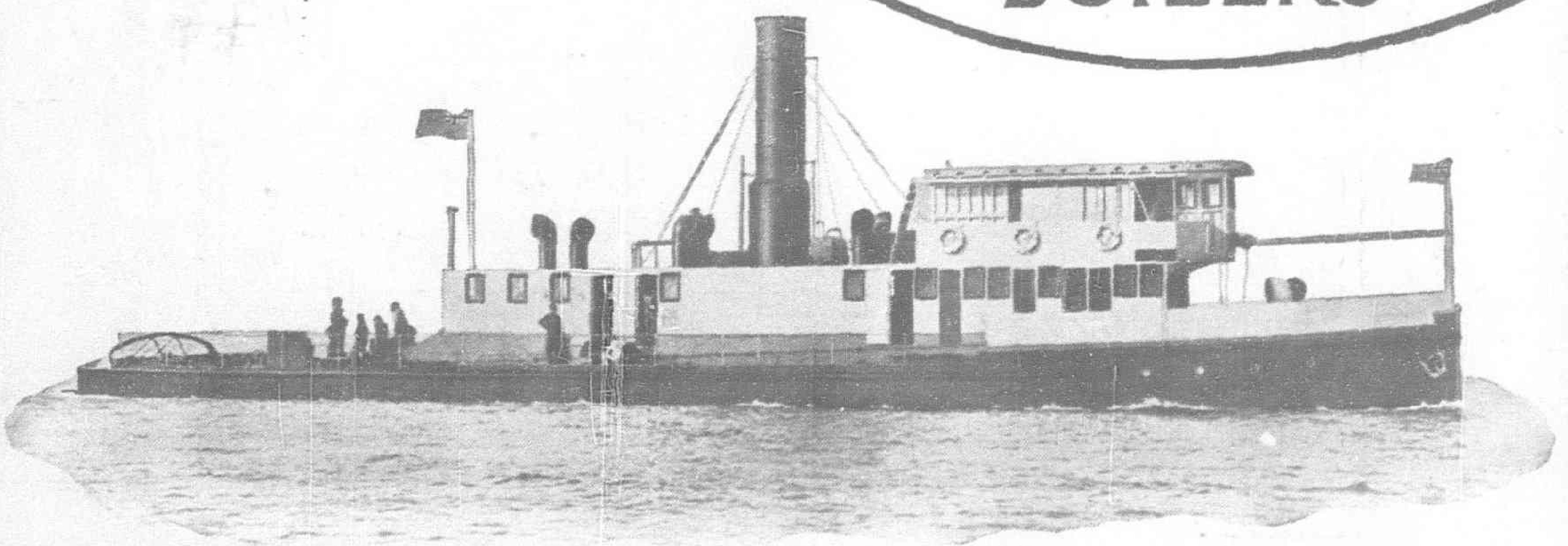
12 Nanking Road, Shanghai
Cable Address: "KOSTER." All Codes

Manufactured by

L. P. DEGEN BELTING COMPANY
San Francisco, U.S.A.

YARROW
& CO (1922) LTD
GLASGOW

for
PASSENGER & CARGO
STEAMERS
SHALLOW DRAFT VESSELS
LAND & MARINE
BOILERS



The Far Eastern Review

ENGINEERING FINANCE COMMERCE

VOL. XX SHANGHAI, MARCH, 1924 No. 3

A Super-Extra-Territorial American Government in China

The Menace To Peace in the Pacific

An Astounding Revelation

By Geo. Bronson Rea

Foreword : Is there an invisible American government in China ? That such an organization exists and functions is admitted by its secretary. Our personal experience is sufficient proof that this inside group is capable of employing unethical methods to destroy the usefulness of those who oppose its policies.

For the past four years this magazine has been subjected to a merciless persecution. During the war while its publisher was in the army it was placed on the American black-list because it was said to have " sold out to the British." After the war a secret boycott was declared against it, because it was alleged to have " sold out to Japan." Confidential pamphlets calculated to destroy its circulation were mailed to all subscribers. False and libellous statements were printed with the object of discrediting its publisher. For two years our name was erased from the mailing list of the American chamber of commerce, notwithstanding that we were a charter member and paid its secretary for the first two years of its existence. We were served with a libel suit on the flimsiest pretext and for damages nicely calculated to compel a sale of the publication if the judgement went against us. After explaining our position before an executive session of the American Chamber of Commerce and producing documentary proofs to support our statements, we were again threatened with a libel suit by a British subject, through the same law firm. In fact, nothing was left undone to destroy the business of this magazine.

All investigations to ascertain the identity of our persecutors lead straight to a small group who form what might be termed an invisible government, with one of the cabinet profiting through our misfortunes.

We abhor anything which looks like a newspaper fight, but the assumption by an American editor of administrative duties and his efforts to decentralize American governmental authority in China in order to strengthen the powers of the group of which he is the official spokesman, leaves us no option.

Journalism has its ethics as well as other professions. The higher code debars an editor from occupying public positions which in any way interfere with his liberty of criticism. A similar code prohibits an official from using his position to destroy the usefulness of a competitor for the benefit of his own enterprises. Yet for the last five years THE FAR EASTERN REVIEW has been compelled to submit to such practices. We have been brought to the bar of justice on the flimsiest pretext and sued for damages which represented the full value of our property at that time, and the case against us was prosecuted by the principal shareholder in a competitive newspaper which stood to profit by our misfortunes.

It has been a screaming joke on us for over five years ; in the following articles we return the compliment.

FOR a long time the existence of a super-extra-territorial American government in China has been suspected by those upon whom its secret mandates have been enforced. The working of this organization has been felt not only throughout China but in the home press, in the halls of congress, in the state, war, navy, justice and commerce departments at Washington and at times even in the executive mansion. As it stands, Americans in China are singularly blessed with all the legal machinery of government. There is a minister at Peking and consular officials throughout the country to protect their interests under the direction of the department authorized to conduct our foreign relations and enforce the treaties. There is a commercial attaché at Peking with wide powers. Under him are a trade commissioner and a registrar of China trade act companies in Shanghai. This useful organization reports direct to the department of commerce at Washington. There is a United States court for China sitting at Shanghai with its judge, commissioner, district attorney, marshal and clerk. An independent army command is stationed in North China under a brigadier-general acknowledging the direction of the secretary of war. In addition, there are the legation guards under command of a colonel of marines reporting to the navy department. A unit of our Asiatic fleet, known as the Yangtze patrol, is commanded by a rear-admiral directly responsible to the secretary of the navy through the commander-in-chief of the station. There is a special representative of the U. S. shipping board with offices at Shanghai operating independently of other departments. The treasury department has an agent on the ground for its own special reasons. There are agents of the department of agriculture scouring China for seeds, plants, bugs and nuts to add to the choice and varigated assortment now found at home. There is a bill before congress to transfer the U. S. court for China from the jurisdiction of the state department and place it under the department of justice, thus creating another water-tight department in China. In fact, as we have several times noted, Americans in China enjoy all the benefits of their democratic institutions except the fundamentals—the right to vote or to be tried by a jury. The machinery of the federal government has been transplanted to China and all that appears to be lacking is co-ordination of the various departments under one executive head.

Now it is manifestly against the rules of the game for the administration at Washington to direct the activities of a quasi-colonial service operating within the confines of another state whose sovereignty over foreigners has been impaired and almost wiped out by treaties and extra-territorial concessions. It was also manifestly impracticable for the president to appoint an extra-territorial governor-general to preside over the American colony in China without committing a breach of international decorum, so the situation has been met and surmounted by the creation of a super-government which operates officiously from a headquarters at Shanghai. This secret conclave devises policies, declares boycotts, and passes resolutions which are cabled through inside publicity channels to the American press or transmitted by mail over the heads of the legally constituted authorities to the government at Washington.

The existence of this extra-territorial government has long been felt by expert observers but because of its picayune and inquisitorial methods, powerful influence over legally appointed officials, an interlocking supervision over all American organizations in China, control over so-called newspaper exponents of American opinion and semi-official ramifications in other government activities, it has been not only difficult but extremely dangerous to condemn its workings without inviting penalties from which for a long time there was no redress.

We are, however, at last permitted to speak with accuracy and invite attention to the operation of this American colonial government in China. *The Nation's Business*, official organ of the United States chamber of commerce, in its February number, prints an article entitled " The Troubles of a Chamber in China " contributed by Mr. J. B. Powell, in his capacity as secretary of the American chamber of commerce of China. Mr. Powell speaks with authority and it is to be assumed with the full approval and consent of the directorate of which he is an extremely useful and active member. At the close of a rather colorful account of the troubles of the chamber over which he exercises secretarial functions, he makes the following astounding revelation :—

> **" Our problems here are much diversified, owing to the peculiar international situation and many of these problems are aggravated because of the weakness of the Chinese central government. When China finally develops a stable government many of the semi-governmental and administrative functions of our chamber will be taken over by the organs of the Chinese government as is the custom in other sovereign lands."**

Exactly. We have here an official confession that a group of Americans in China has arrogated to itself the administrative functions of government, usurping the prerogatives of the duly constituted and appointed American authorities provided for by the

(From The Manila Bulletin)

U.S.-JAPANESE LOAN RUMORS WORRY CHINA

Fears $50,000,000 For Rehabilitation Will Be Mishandled by Tokyo

"MAILED FIST" THREAT

Believes Japan Plans to Strengthen Control on Republic

By J. B. POWELL.

(Chicago Tribune Exclusive Service)

SHANGHAI, February 3.—Press advices here from New York city and Tokio to the effect that American bankers are lending Japan $50,000,000 for rehabilitation are causing apprehension in Chinese financial circles, owing to reports from Japanese financiers that it is the intention of the Japanese to use a great part of the money for clinching Japan's control of China, especially in the cotton industry, instead of using it for the announced purpose of restoring Japan after the quake and fire of September 1.

Americans Apprehensive

The American chambers of commerce here also are apprehensive as shown by a resolution of the American chamber of commerce of Harbin several months ago, expressing fear of American money coming into China through Japanese hands which might result in the undoing of the work of the Washington conference.

The Associated American chambers of commerce of China in the annual meeting in 1922 passed a resolution, saying in part :

" It is essential from the American national standpoint that American capital should come into China through American agencies, thus preserving our individuality and contact with China and the Chinese people which is necessary to the future peace and prosperity of the two peoples."

Open Door Threatened

Americans, interested in the commercial development of China and who have worked years to open China to American commerce, are frankly apprehensive that unrestricted use of American capital in China under Japanese control and through Japanese agencies would have the general effect of undermining American business in China and undoing long established American policies of the open door and territorial and administrative integrity of the Chinese republic as covered in the nine-power treaty adopted at the Washington conference.

Americans interested in the development of American business in China naturally have no objections to American loans to Japan but believe that the state department should obtain guarantees that the money is not to be used in China in enterprises detrimental, either to American business or to long established American policies, respecting China, otherwise they may have serious international complications in the future.

treaties. The following paragraph from this most interesting and enlightening document supplements the above :—

" It used to be our practice, when some special problem developed affecting American trade or interests out here, for a body of Americans to get together and draft some kind of resolution or protest or approval and hand it to our local American consular official with instructions for cabling to the department involved. We have discovered that we get better action when we also ask the national chamber of commerce to take up the matter personally with the government."

If further evidence be needed of a determination to direct the policies of the nation against the dictates of the government, it is only necessary to refer to the set of resolutions passed by the associated American chambers of commerce at their last annual meeting. These resolutions decided to supplement the usual methods of communicating with the government at Washington through its duly appointed representatives and in its stead create an independent diplomatic service of its own by the appointment of a special delegate to reside at Washington and enlist the aid of the chamber of commerce of the United States, government officials and departments, commercial and other organizations interested in the various subjects referred to him for attention. The resolution went on to say :

> " Owing to the fact that foreign trade occupies such a small portion of the interest or activities of the American people generally, it is always difficult to induce the American government to adopt constructive and continuing policies in foreign affairs and especially in respect to American interests in this part of the world. The lack of familiarity on the part of many of the officials at Washington in respect to the protection of the lives and property of its own citizens not to mention the larger diplomatic and strategic interests of America in the Far East has made it necessary for American citizens both individually and through their organizations to frequently conduct publicity campaigns in the United States. Such publicity campaigns in the past, although largely unorganized, have nevertheless been of considerable benefit in concentrating the attention of the American people and through them of the government upon particular problems affecting the interests of Americans in this part of the world.
>
> " In view of the serious situation now existing in China which constitute a menace to the lives and interests of American citizens residing in the Chinese republic, it is recommended that the associated American chambers of commerce of China give this subject special attention and that a special committee be appointed to work out in co-operation with other American organizations, a definite publicity campaign calculated to bring to the attention of the American people, members of congress and other officials of our government the necessity of a definite policy in respect to the present situation of China."

In our last November number, under the caption of a " Superfluous State Department " we commented upon this usurpation of governmental functions and emphasized how a campaign to educate the American people to their larger diplomatic and strategic interests in the Far East under such direction might easily conflict with the policies and program of the state department and precipitate a " show-down " in our relations with some friendly power.

If it was not for the danger arising from the operation of a self-constituted super-government holding views diametrically opposed to the policies of its home administration its existence would be considered a huge joke and the pretensions of its leaders a matter for the comic newspapers. But the danger exists and cannot be lightly set aside if good-will and peace are to follow the Washington treaties. Mr. David Lloyd George looking ahead to the next appalling world war says that the only salvation for civilization lays in assiduously cultivating good-will between the nations. " Peace is only possible " he says, " when you introduce into the attitude of nations towards each other principles which govern the demeanor of decent people towards their neighbors. The men who are always sowing distrust and dislike of men of other races and lands should be picked out, condemned, shown up, hunted by the scorn, the contempt and the wrath of their fellowmen." The great Welshman is right. One menace to world peace lies in the persistent efforts of a group of bigots to keep alive the fires of resentment against Japan at a time when the best intellects are striving to find a harmonious solution to Pacific problems.

At the head of this group in China stands the editor of *Millard's Review*, now known as the *China Weekly Review*. We could cite innumerable instances and quote from many articles and documents to support the statement that Mr. J. B. Powell, as secretary of the American chamber of commerce of China, has employed this position to give force to his anti-Japanese proclivities. There exists ample evidence that the driving power behind this director of American activities in China is an intense hatred of Japan. It is important, therefore, for Americans concerned with the establishment of peace in the Pacific to fathom Mr. Powell's mind, to discover his basic ideas with regard to China, to understand his psychological reaction to the events of the day. In the first place, every country has its " Little Englanders," those provincial human beings who sincerely believe, " My country right or wrong," who refuse to understand the other man's point of view and who hit at everybody else not because the other fellow is wrong but because they are so patriotic as to be lop-sided. Mr. Powell's patriotism moves in that direction. He not only sees " America first," but " *America uber alles*," an epigram which cost Germany the friendship of the world. This, then, is not a matter of good-will but one of judgement. An individual so nationally-minded that he forgets there are other people on the face of the earth naturally cannot give a square deal to other people. America stands for a square deal. It does not want to build itself up by taking advantage of anyone. Mr. Powell, in constantly attacking other nations is not taking the American point of view. He is taking a point of view which he as well as other Americans deprecate in other nationalities. He and others call it imperialism when the phenomena appears in Japan or Britain. They call it patriotism when they practice it themselves. Those who hold opposition views are called traitors.

With regard to Japan, Mr. Powell's position is hopeless. He hates Japan. He can see nothing good in Japan. Even the terrible disasters of the earthquake awakened no chords of sympathy in him. He sought for evil conduct even there and his publication gave space to stories about atrocities and misconduct, while the rest of the world was aroused to sentiments of pity and friendship for a great nation in distress. While the people of the United States were responding to appeals for help with a big-heartedness that knows no nationality, he was worrying over the suppression of a news story—something which all governments do in time of national calamity. When Japan was negotiating her reconstruction loan in the United States Mr. Powell sent a wire to the *Chicago Tribune* which was published in the *Manila Bulletin*, one of the newspapers included in his special news service from this country. The working of his mind and methods and how he utilizes the invisible government of which he is the secretarial head to give force to his propaganda is laid bare in the news dispatch appearing in the centre of the previous page.

The approval of the state department to the loan means nothing to Mr. Powell. The state department is quite incapable of conducting the foreign relations of the nation from the viewpoint of his group. See how delftly he drags in the American chambers of commerce to support his utterly gratuitous slap at Japan and by inference the ability of the state department and our financiers to look after the higher interests of the nation. Note how insiduously the idea is injected into the mind of the reader that this wholly friendly and humanitarian loan will result in the undoing of the Washington conference. Note how the resolution of the American chamber of commerce of Harbin against the floating of the National City Bank loan to the Japanese Oriental Development Company is lugged in to give force to his statement. The hong list is proof that the American chamber of commerce at Harbin is composed in large part of firms whose managers, sub-managers and employees bear Russian names. The whole argument is typically anti-Japanese, intended to kill the reconstruction loan before it was offered to the public.

Had Mr. Powell written his cable in 1919 or 1920, there would be little gainsaying his statement that Chinese were opposed to it. But a careful survey of Chinese opinion, particularly financial opinion, indicates a complete indifference to the loan.

What is most surprising, however, is that the state department has not worried about these stories, that it has not feared Japan's clinching its hold on China's cotton industry and that the big American financial interests which are naturally more concerned with America's position in China than Mr. Powell, would strongly favor the loan and not worry about its uses in China. Furthermore, a similar loan was taken up by British banks and everyone who knows of economic conditions in China knows that the textile situation is one of Britain's fondest interests in this country. Yet, they were not concerned.

It will be readily seen from this one example that Mr. Powells' attacks upon Japan are merely the manifestations of a one-track mind, a hold-over from the war period when he and his colleague dominated American opinion in China through a newspaper which was accepted as the official organ of the American chamber of commerce. Baiting Japan was then the fashion. The head-baiters were placed in high positions and it was easy for the little fellows to follow along and swell the ululations of the pack with the volume of their snarls and growls. As Lloyd George says of the anti-Semitic: "those who indulge in Jew-baiting would be the first to run away were there any element of danger in it. Jew-baiters are generally of the type that found good reasons for evading military service when their own country was in danger." We have noticed the same phenomena in the rank and file of the Japan-baiters.

Serious as these attacks upon Japan are, even more serious and dangerous to the preservation of peace and good-will in the Pacific are the semi-governmental and administrative activities of a group which includes in its membership such prominent Japan baiters as Mr. J. B. Powell. Exactly what are these semi-governmental and administrative functions of the American chamber of commerce of China? By what authority does the chamber function semi-governmentally? Does the president of the United States know about this? Does the department of state know about this? Has the United States District Attorney investigated this usurpation of governmental powers? Is the Chinese government aware that its weakness is being used to further impair its authority? Is it aware that above the regularly accredited representatives of the American government in China there has been created an organization which is taking advantage of its impotence to usurp its functions? There would seem to be no other interpretation to the confession of Mr. Powell. Here is a matter which the executive committee of the American chamber of commerce should clear up, and at once, so that Americans in China may know where they stand.

There is much also in the interpretation of this paragraph that Americans should be informed of without delay. For instance, when an American in China is in difficulties should he apply to his minister, his consul, or to the American chamber of commerce? When there is a trade-mark violation, illegal taxation, banditry outrage, need of protection, default on a loan or refusal to pay a government obligation, or any of the thousand and one questions which constantly arise, should he apply to the regularly appointed American officials or to the super-secretary of the American chamber of commerce?

Are we to accept the conclusion that the entire matter is a farce, or, an assumption of authority where legally there is none, a meddling in affairs where constituted authorities are provided? All this gives to foreigners an impression of disorganization of authority actually not existent and gives to certain individuals a false sense of their own importance which not only seriously menaces their usefulness but makes for friction at a time when the first duty of every clear-headed citizen of all nations is the cultivation of international good-will. As a writer in the *New York Commercial* puts it:

"Those vociferous folk in Manila, Shanghai and other parts of Asia, who identify American business with slaps at the Japanese, and guffaws and swear-words at the long suffering Chinese, have outlived their usefulness. They are not popular in the capital of the nation, or in New York, the capital of the nation's business."

Is it not time that Americans asked where all this is leading to? May not the time arrive when the Chinese government may demand through the regular diplomatic channels a fuller explanation as to just what the American chamber of commerce of China means by this frank admission of its honorary secretary? Would not the Japanese government be equally justified in inviting the attention of the Washington authorities to the existence of a super-administrative body operating from Shanghai which loses no opportunity through its secretary to question its good faith and stir up animosities? May not the time arrive when the government at Washington will become fed-up with these encroachments upon its authority, with these floutings of its policies, and take the necessary steps to stamp out this menace to its prestige and the perpetuation of friendly relations with Japan and China?

Mr. J. B. Powell has placed the American chamber of commerce in a most unenviable position.

Again, That Superfluous State Department

OUR criticism of the decision rendered by Commissioner Lurton of the U. S. court for China appearing in our February number is employed by *The China Press* to present the side of the court in terms which further strengthens the argument that the state department should be untrammelled in its conduct of our foreign relations. *The China Press* says:

> "A monthly magazine has taken upon itself to criticise the decision, not because it may be legally wrong, but because it might lead to unfortunate developments in the diplomatic history of the Far East, involving the reopening of a large number of questions which had been regarded as effectively settled. *But we are of the opinion that the decision of the court deserves no such criticism, but rather praise as a ruling calculated to reaffirm the constitutional rights of American citizens as defined by treaties embodied in our law. The treaties of 1844 and 1858 having been ratified by congress became part of the law of the United States and no agreement between other countries can modify the privileges of our citizens without the consent of our legislature. It is consequently a matter of relatively small importance what interpretation the state department cares to put on the documents involved in this case.* Indeed, we have always understood that in various rulings secretaries of state have refused to pass on any question the answer to which might bring it into conflict with any tribunal, and the inference to be drawn from this is, that the state department itself desires the courts of the United States to be absolutely untrammeled by any political or diplomatic consideration.
>
> "What the writer of the article in question apparently fails to perceive is that the duty of any court of justice is to administer the laws applicable within its jurisdiction and to suggest that such application should be subject to diplomatic expediency is to advance a proposition foreign to the spirit of any judicial process."

Quite right. The legal aspects of the decision are beyond our criticism. Our comment takes the form that it is manifestly injurious to the prestige of the American government for an official of a bureau under the direction of the state department to precipitate a delicate international issue without consulting beforehand with his superiors, especially when the decision reverses the established policy of the government, renders possible a readjustment of our foreign relations and says in effect, that the state department is incompetent to interpret the treaties. Rushing through such a decision and giving it out immediately for publication in the local press without reference to the position of the state department would seem to be the height of discourtesy, one that would not be tolerated in any other government or private business enterprise.

If it is a matter of relatively small importance what interpretation the state department cares to put on the documents involved in the Lurton decision, then its stand on other equally delicate international questions is also a matter of relatively small importance and opens the way for further impairments of its constitutional powers by other federal departments operating in China under treaty provisions which, in the last analysis, the state department is called upon to interpret and enforce. A bill is now before congress to have the U. S. court for China transferred from the jurisdiction of the state department to the department of justice. The bill has received the endorsement of the associated American chambers of commerce of China. The "American" newspapers reflecting the policies of this organization are very strong in support of the measure. Any scheme which undermines the authority of the state department by the independent operation of other American governmental departments in China tends to strengthen the authority of the invisible government in this country, and would naturally receive the approval of the editorial writer for *The China Press.*

Now, there would seem to have been no urgent judicial issue involved in raising the question of the court's jurisdiction over American citizens in the Kwantung leased territory, for, after rendering the decision, the accused was permitted to depart from the jurisdiction of the court without hindrance. It would seem that after setting aside the established policy of the government and precipitating the issue with Japan, the court should have as energetically enforced its decision and remanded the accused for trial. As it stands, an international issue has been created without in any way advancing the ends of justice. When viewed from this angle, the decision can properly be interpreted as a wholly gratuitous slap at the state department—part of the campaign to have the court freed from its supervision.

Aside altogether from the embarrassment to the state department, the decision precipitated another major issue between China and Japan. As soon as the Chinese authorities learned of the decision and how it would bolster up their demand for the retrocession of Kwantung, the civil governor of Fengtien province, Mr. Wang Yung-kiang, sent a formal note to the Japanese authorities at Port Arthur demanding the immediate surrender of all Chinese criminals and, furthermore, stated that henceforth Chinese jurisdiction would be exercised over its nationals in the leased territory. It can be seen from this that the Chinese lost no time in hanging on to the coat-tails of Uncle Sam hoping that the Lurton decision would be enforced by Washington.

The Japanese foreign office flatly refused to consider the demand. When this reply was communicated to the Chinese authorities at Mukden by Mr. Funatsu, the Japanese consul-general, the Chinese side-stepped. It was all a mistake they said. The demand had been made without the knowledge or consent of the civil governor and transmitted by a subordinate official who had exceeded his authority. The note was withdrawn, but it is significant that the Chinese backed-down solely because it had been transmitted through irregular channels and not because they relinquished the point. They are now holding back, waiting to see what attitude the American government will take. If it should uphold the Lurton decision they will quickly re-open the question and lean on American diplomacy to pull them through.

As Japan refused to discuss her status in Manchuria and Kwantung before the Washington conference, so she rejected the Chinese demand. She will undoubtedly refuse to consider any re-opening of the question. The state department is fully aware of Japan's attitude, and we feel certain that had the decision been brought to its attention before being made public it would have found good legal reasons to defend an interpretation of the treaties which have been in force for the past twenty years. There is little chance of raising any serious issue between the Japanese and American governments over this decision but on the other hand it might, by misleading the Chinese, influence the latter to revive their demand at some future date.

The time is past when the people of the United States will consent to act as the special guardian of China and any move on the part of Americans which may be interpreted as an open espousal of her cause against Japan is to be strongly deprecated. As far as Japan is concerned, the Manchurian question was settled at Washington, but we can expect to find issue after issue created by the Chinese in order to keep alive the agitation against Japan. Coincident with the filing of the Chinese demand for jurisdiction over their nationals in the leased territory, Marshal Chang Tso-lin initiated another movement for the recovery of the Antung-Mukden section of the South Manchuria Railway. The demand will be based on clause six in the supplementary agreement to the sino-Japanese treaty of 1905 which says that at the end of fifteen years from the date of reconstruction of the Antung-Mukden Railway, each contracting party shall appoint an appraiser who shall proceed to a valuation of the line and its properties, and they shall be sold to China at the appraised price. This is merely another attempt to bring up the validity of the 1915 treaty in which Japan's control over the property was extended to 99 years. Reports from Manchuria state that the students are preparing for another campaign for the recovery of sovereign rights, etc. No matter what the merits of this dispute may be, it is clearly the duty of Americans, especially those in official positions, to refrain from any action which might be interpreted by the Chinese as a support of their tactics.

There can be little doubt that the Chinese seized upon the Lurton decision to further their own ends. If this was an isolated instance of intervention in diplomatic affairs by other federal departments it might be dismissed as of little consequence. It, however, follows other equally serious impairments of the state department's authority in China. Next to the "open door" doctrine the most important policy designed to enforce its provisions and eliminate the spheres of influence was the creation of the international financial consortium. The American government initiated the plan for this new combination, invited the other powers to join and employed the full weight of its prestige to push it through. Yet within a year the commercial attaché at Peking was making speeches before chambers of commerce at home attacking the consortium and advocating independent financial activities. The picture presented to the governments induced to surrender and pool their special interests and concessions in this new organization was not a pleasant one. In order to save the American government from the charge of double-crossing its partners, the state department in this instance asserted its authority and put a stop to further attacks upon the consortium by officials of other departments.

On a par with such activities stands the resolutions calling for intervention passed last year by the super-extra-territorial American government of China, without consultation with the properly constituted authorities or without reference to the general wishes of Americans. The major commercial and philanthropic American interests in China are placed in jeopardy for a policy neither they or the Washington government had any share in fashioning. Had the official representatives of the American government been invited to take part in the discussions leading up to these resolutions many of their objectionable features would have been eliminated. Had even some legal expert been consulted, the committee would have been convinced of the mistake of meddling in matters which exposed it to the criticism of not knowing what it was talking about.

The effect of these resolutions has been to create deep distrust of American policies in China and hamper the state department, legation and consulates in carrying out the real policy and program of the government. We cannot have one government at Washington and a group of citizens in Shanghai exercising semi-governmental and administrative functions and passing resolutions which nullify the real policies of the nation. Neither can we have officials of other federal departments functioning in China independently of the state department without inviting similar clashes of authority.

We are of the firm opinion that friendly relations between Japan, China and America can best be maintained by the department authorized by our laws to supervise and direct them. We are unalterably opposed to any modification of these basic laws that will permit another department to intervene and nullify its duties. If a super-extra-territorial government exercising administrative and semi-governmental powers is to exist in China in conjunction with other federal departments operating independently of the state department and are encouraged to incite race hatreds and precipitate dangerous international incidents, then Americans may as well prepare for the worst. G. B. R.

Anglo-American Co-operation

A $150,000 Joke at our Expense

THE longer one stays in China the more he is impressed with the necessity of preserving a sense of humor if he is to retain a proper perspective on the march of events. At a dinner given recently by Mr. H. E. Arnhold (chairman of the British chamber of commerce at Shanghai) to his associates, he took occasion to emphasize the necessity for Anglo-American co-operation because " it will always be difficult to achieve anything out here if we are to be dependent upon unanimity among twelve or more powers. If, however, the two English-speaking races co-operate, the other powers, in most cases, will fall in line." "The Americans," he added, "have done everything they could during the past year to show us that they wish to co-operate with us, a spirit which has not been confined to the chambers of commerce but has been seen in the discussions of consular officials."

Mr. Arnhold was evidently so deeply interested in his subject and so impressed with the American desire to join hands with the British that he for once lost sight of facts, which had he known, would have tickled his keen sense of an enjoyable situation. He would have seen that those Americans with whom he had been in contact were the same gentlemen conspicuous only three years ago in defeating this coming together of the two great English-speaking peoples. At that time any deluded American who openly allied himself with British interests was a "traitor" to his country, an object of suspicion, a man to be ostracized and boycotted by all good patriots.

Time, however, works wonderful changes. The man who was a "traitor" yesterday becomes a patriotic leader to-morrow and the patriots of yesterday are the "traitors" of to-day. Three years roll by and we find the same group of Americans who denounced and persecuted their countrymen for co-operating with the British now leading the procession shouting for the doctrine they so bitterly condemned when practiced by others. There must be some excellent reason for their conversion. So we are tempted to tell a funny story.

The Far Eastern Review is and always has been a strong advocate of Anglo-American co-operation. In fact, it was a pioneer in the movement, one of the first to apply and carry it out in practice. Long before such co-operation was dreamed of by others we accepted the principle as a guide for our own activities and in doing so fashioned a club that was subsequently employed to kill our usefulness in this community. The public perhaps are not particularly interested in the troubles of a newspaper, but it is entitled to know the reasons why its publisher sees the comic side of a policy now endorsed by the combined American and British chambers of commerce.

When this magazine was started twenty years ago its publisher realized that the first requisite to success in this international field was fair play to all interests, irrespective of nationality. This basic rule applied with special force to the British whose capital and enterprise working hand in hand with an intelligent and fixed governmental policy had developed the then existing railways, mines and foreign industries in this country. As a result of this policy of fair-play, The Far Eastern Review received the hearty support of British financial, commercial and engineering firms many of whom have been advertising in its pages since the first year of publication. Even when, in our opinion, it was necessary to criticise British policy and methods, this friendly support was never withdrawn.

In carrying out our idea of Anglo-American co-operation the publisher of The Far Eastern Review engaged in 1911, a British editor, and gave him outright a substantial interest in the business. In effect, this magazine became an Anglo-American enterprise, an ideal business arrangement for any publication catering to the Far Eastern field. Under this direction its business ran along prosperously and smoothly until 1917, when America entered the great war. Its publisher, feeling that his interests were fully safeguarded by his British associate, joined the army and was sent to France. One of the first letters received from his American representative conveyed information that the agents of a new American weekly which had started publication in Shanghai shortly after America entered the war, was soliciting advertising from his clients on the ground that The Far Eastern Review was no longer an American publication, that its owner had sold out to the British and had left China for good, therefore it was the duty of American manufacturers to support a *bona-fide* American publication that would exclusively defend their interests.

A similar story was circulated throughout China at a time when hundreds of American firms were opening offices in this port. In due time it came to the ears of the acting American commercial attaché at Peking and without stopping to verify the rumor, this gentleman sat down and wrote an official report on the conduct of business with China in which he stated that The Far Eastern Review, formerly American owned, had passed under British control. This made the story official. It was published in a special commerce report and read by every American firm interested in Far Eastern trade. It placed The Far Eastern Review on the American black list and deprived us of any benefits in advertising business that followed the export boom.

Now, we have no legal evidence as to who originated a report obviously intended to injure us with American manufacturers, but we have absolute evidence of who spread it and profited by it. In commenting on the appearance of the first number of the *British Chamber of Commerce Journal*, the editor of *Millard's Review* at that time secretary of the American chamber of commerce, invited attention to the official report of the department of commerce regarding the British ownership of The Far Eastern Review and stated that British control over these two newspapers was an indication of their determination to protect their interests in China. Again, there was no attempt made to verify the story, not even the courtesy of calling up this office on the telephone to ascertain whether it was true or not. The Far Eastern Review was a charter member of the American chamber of commerce and for the first two years permitted one of its staff to act as secretary, when the chamber had no funds. Yet while its publisher was in the service, it was placed on the American black list and a new secretary of the American chamber of commerce who should have protected a member who was absent and could not defend himself, was the first to take advantage of the lie to advance his personal interests. It was a curious coincidence that for nearly two years the name of The Far Eastern Review was dropped from the chamber's mailing list; an oversight on the part of the secretary. The mere fact that The Far Eastern Review had a British editor and was printed by the press of the *North-China Daily News* was sufficient to condemn it, to place it outside the American fold. Its business was taken away and injured to the extent that a new American industrial monthly publication covering the Far East from Tokyo was enabled to start its first number with over one hundred pages of advertising matter at enormous war-time rates while this publication was barely able to eke out an existence.

To such an extent was the campaign against The Far Eastern Review carried in America that on the publisher's return after two years' war service, many of his old business friends in New York refused to see him. They wanted nothing to do with a paper engaged in boosting British products. It was impossible to sue the American government for damages. It was equally difficult to counteract or catch up with the report. The only remedy and a poor one at that, was to have the department of commerce officially deny it in the commerce reports. This was done, but coming a year after publication of the first report, it was too late. The business of this magazine in the meantime had been skilfully diverted to others. There was no redress. Our contribution to an honest idea of Anglo-American co-operation cost us at least $150,000 gold in business in two years and permitted two competitors to practically monopolize American advertising for the Orient. It was a great joke on The Far Eastern Review. We are still laughing over it.

Let us look at another $100,000 phase of Anglo-American co-operation, which hides another joke at our expense. Three years ago in Peking, a general officer of the American army, confided to the publisher of The Far Eastern Review that the fiat had gone forth that he was to be broken and run out of China because of his uncompromising opposition to the then popular anti-Japanese agitation. Two days afterwards we were served with the papers in a libel suit for referring to a British subject residing in Antung as a "Sinn-Feiner." The damages were nicely calculated at $100,000 or all that The Far Eastern Review was estimated to be worth at that time. If the suit went against us, the little property we had created as the result of eighteen years of hard, up hill pioneering work would have been wiped out to satisfy the judgement. Incidentally all our American business would have gravitated to some other American-owned publication. The case in every way was identical in this respect with the celebrated libel suit against the *Chicago Tribune* for $2,000,000 damages, or the entire estimated value of its plant and property. It also was to have been wiped out because of its fight for honest government in Chicago. The right to sue a newspaper for the full value of its property and good-will was fought out in an American court which rendered the verdict that such damages were entirely out of proportion to the ends of justice, therefore illegal, a flagrant attack upon the liberty of the press.

Now as far as we have been able to discover, the suit against us was not intended so much to salve the wounded feelings of the gentleman whose political affiliations had been misstated as it was to get us on the witness stand and through a grilling cross-examination "show us up" through cleverly put questions designed to create the impression that this publication had been sold to Japanese interests.

Politically, the case was intended to keep alive the flagging agitation against Japan and help along the campaign to cancel the Anglo-Japanese alliance. It was to have been the international sensation of the year. Reuter's agency made a spread of the filing of the suit, and was prepared to give the proceedings world-wide publicity.

Three years have rolled by and the case has never been brought to trial—nor as far as we know, has it been withdrawn. We are still waiting to be "shown up." Now one of the cleverest jokes to play on a political opponent or business competitor is to get him into court in some civil action and never permit the case to come to trial or be stricken from the calendar. It has a most chastening effect on the victim of the joke. If the victim be the owner of a newspaper unduly critical of a corrupt gang which runs the government, it is an excellent club with which to regulate its policy. It puts its publisher in bad odor with the court and prevents any undue social intercourse with the judge. The suit against this magazine had just that effect with the American court in Shanghai.

We have already stated the facts in regard to the neat little trick which placed THE FAR EASTERN REVIEW on the American black list during the war and which cost us $150,000 in business. We will draw the veil rapidly over the subsequent movement engineered by members of the American chamber of commerce which resulted in the loss of one third of our advertising in three months, and say in parenthesis, that we hold the evidence that several American manufacturers were prevailed upon to cancel their advertising in this magazine and insert it in the weekly publication, whose editor officiated as secretary of the American chamber of commerce.

We might also state in fairness, that similar pressure was brought to bear on British firms to cancel their advertising, but without success. Special pressure was brought to bear on the manager of the engineering department of the largest British firm in China, because our opponents knew that by enlisting him on their side at least ten of the most important British machinery manufacturers would be guided by his example. This was intended as our *coup de grace*. The answer of this gentleman was very emphatic. He told the boycotters to go to Sourabaya.

Now comes the real joke. The prosecuting attorney in the case, was no other than the largest stockholder in *Millard's Review*. It is necessary for the community in which we live to get our perspective on this situation to understand the joke. Here we were being sued for $100,000 on a flimsy libel charge, through a lawyer who practically owned a competing newspaper known throughout China as the official organ of the United States court! We laughed heartily when two American and one British lawyer refused to defend our case when they learned who was acting for the other side. The joke was on us.

The legal proof exists that the editor of *Millard's Review* circulated a report which placed THE FAR EASTERN REVIEW on the American black list during the war while he was in honor obligated as secretary of the American chamber of commerce to defend its publisher at a time when he was wearing the uniform in France and could not protect his interests. There is further legal evidence in the columns of his newspaper that he wilfully published false and libellous reports calculated to discredit and damage the reputation of the publisher of this magazine.

There is also legal evidence in our possession that another incorporator and shareholder of *Millard's Review* circulated the story that the publisher of this magazine had "sold out to Japan," which was used as the basis of the boycott engineered by members of the American chamber of commerce to ruin our business and as justification for a series of bitter attacks upon us by the late editor and proprietor of the *Japan Chronicle*. It is a curious coincidence that after we had called a meeting of the executive committee of the American chamber of commerce (attended also by the American consul-general) and frankly explained our position and answered the reports circulated by our opponents and satisfied the meeting with documentary proof of everything we had to say, that within a few days we were faced with a libel suit brought by a British subject for statements made before this strictly private and executive American meeting. Again, the notice, curiously enough, was served through the legal firm whose principal partner was the principal shareholder in *Millard's Review*. This was Anglo-American co-operation with a vengeance.

Our sense of humor can be appreciated when it is known that some time ago we asked an American merchant prominent in the activities of the American chamber of commerce why he deserted THE FAR EASTERN REVIEW during the war. It was a source of great amusement to this gentleman. "Why," he laughingly replied, "should we have anything to do with your paper. You were on the list as a British publication. You were not on the job and your magazine was edited by an Australian and printed by the *North-China Daily News*. Naturally, American firms in Shanghai gave their support to a hundred per cent. American paper." Now this same patriot has since become managing director of a British registered company and a partner in one of the most important British trading concerns in China, one of the leaders in the movement for closer Anglo-American co-operation. Is it any wonder we are so mirthful?

The joke grows hilarious as we see the honorary secretary of the American chamber of commerce working hard for Anglo-American co-operation through the editorial columns of *The China Weekly Review* and *The China Press*. This mental gymnast was the most bitter opponent of the doctrine when practiced by THE FAR EASTERN REVIEW. Now, we find this uncompromising American patriot editing a daily newspaper owned by a British subject, just reversing the "treasonable" conduct of the publisher of this magazine. Of course when such eminent leaders of the American community in China change their viewpoints on Far Eastern political conditions, the common-ordinary-every-day American maintained in ignorance of their semi-governmental and administrative activities have no right to question the reasons why. Our political opponents of three years ago have seen the error of their ways and like the prodigal son are now seated at the table feasting on the Anglo-American calf fattened by THE FAR EASTERN REVIEW at a cost of $150,000 gold. May their waist line expand!

Coal Mining in Manchuria

The mining bureau of Mukden has opened two coal mines in the district of Fengtien, west of the Liao River. The first, which is in the foothills west of Koupangtzu junction on the Peking-Mukden railway, has been in operation over a year. Already the initial expenses are being repaid by the output of coal from the four working pits, writes the Takumen correspondent of the *North China Daily News*. Recently the bureau of mines despatched a trained mining engineer and staff, with adequate provision of funds to bore for coal in a scientific way at or near a mine 13 miles west of Takumen. Preliminary surveys have convinced that there is a wide field in the neigbourhood. At present the operations are hampered by a considerable depth of water. If the yield turns out as satisfactory as is expected, this mine will, like the first, be connected with the Peking-Mukden railway. To the nearest station Hsinmintun, a line of some 53 miles would be required.

Sino-Japanese Enterprise in Kirin

According to reports from Changchun, understandings have been established with the Chinese side through the efforts of Japanese acting-Consul-General Fukazawa, concerning the organisation of a company for working forests in Kirin and undertaking other enterprises in the province. It is said that a semi-official Sino-Japanese joint capital company will be established, called Chungtung Meilin Kungssu, the Chinese side being represented by the Kirin government. The capital of the company will be three million yen, which will be put up share and share alike by Chinese and Japanese, the Japanese promoters paying on behalf of the Chinese shareholders, for which the latter will pay annual interest at 6 per cent. Officers of the company are to be made up of a director-general, which post shall be filled by a Chinese, four directors, eight assistants, an equal number of Chinese and Japanese filling the posts. It is stipulated that a salary of 2,400 yen must be paid to each of the Chinese directors, and half of that sum to an assistant, irrespective of business conditions. In case of failure of the business, the Chinese side shall not be held responsible for the loss. The company will pay a sum of Yen 100,000 every year to the Kirin government as royalty.

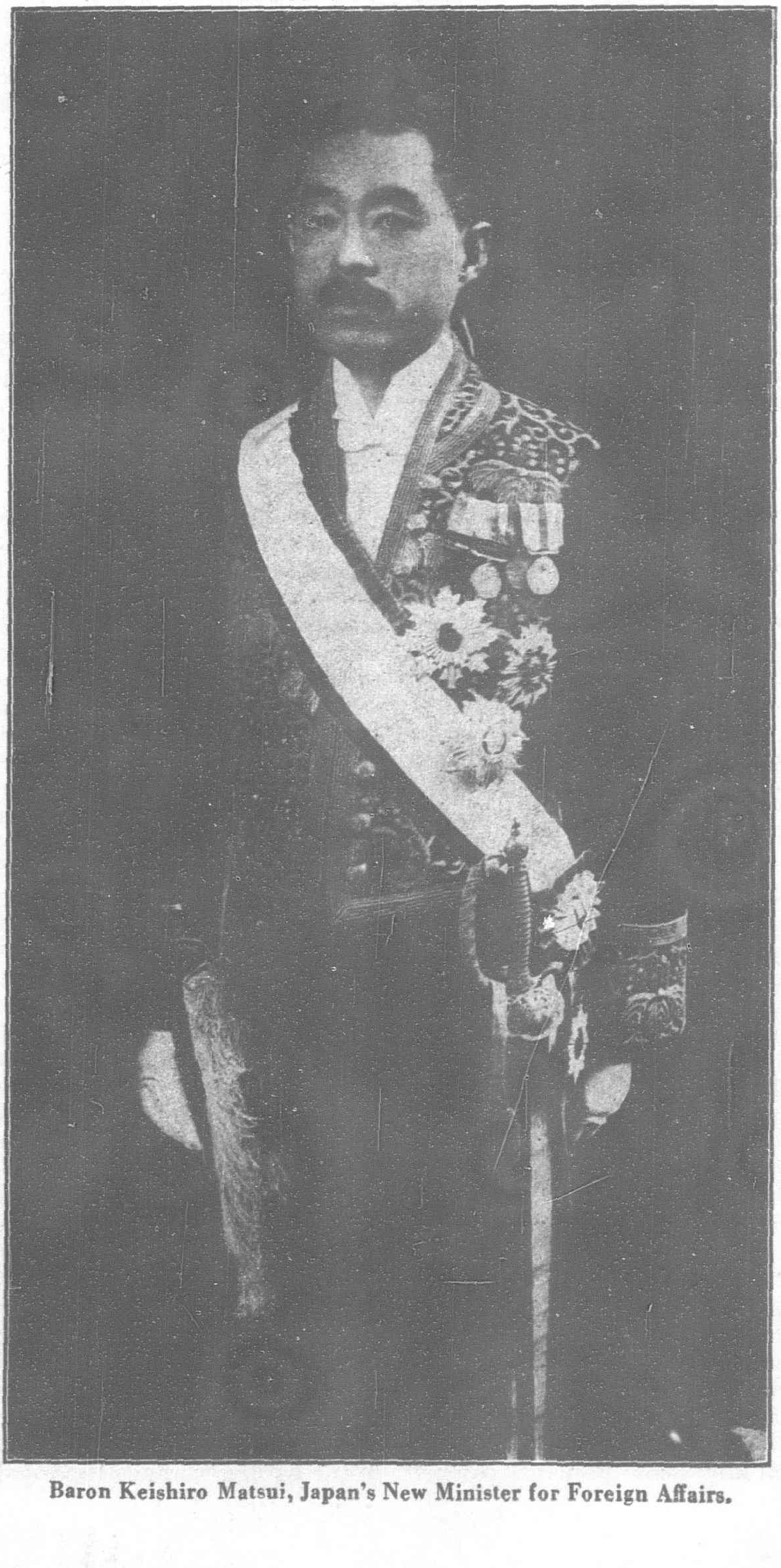
Japan's Message to China

Baron Matsui in a splendid address before the Rotary Club of Tokyo sends a message to the people of China that Japan is their Friend

> **"In competition for trade and concessions for developments that are necessary or valuable in China we have little to fear from foreign rivalry. The field of China is big enough for all foreign investors and foreign business men. We have not the financial capacity to supply all the capital that China will require for decades to come: nor have we the commercial ability or resources to meet all of China's needs. But we have the advantage of the closest proximity: and if we develop our own ability within and among ourselves to meet the vast requirements of our neighbor, our rightful share of the trade cannot fail to come to us. And I believe that in developing this trade, and for the development of it, we cannot and must not fail to achieve the confidence and the friendship of the Chinese people."**

"IT is difficult to realize, in this fast-moving age, how short a time ago it was when powerful leaders of powerful nations thought that to the strongest belonged the right to grab the most. Here in the Far East we have lasting reason to know what that policy of relentless competition meant. It was only a quarter of a century ago that the flags and the forces of foreign nations were following—and sometimes leading—their traders and investors into the territory of our great neighbor of the mainland. The scramble for concessions and the competitive drive for trade concerned our security as well as it did that of our unfortunate neighbor. The competition was generally called imperialistic, and that term properly described it, in so far as certain of the statemen of that day influenced or led their countries. But, in the minds of ordinary men, the struggle was for "business." It meant, they thought, more foreign trade, the development of home industry, the employment of more labor at better wages, and altogether better national prosperity, for their particular country. So the argument for the aggressive policy had a distinct appeal, and some of the ordinary men of all, and many of the ordinary men of some nations, permitted themselves to be led, misled, into the false cause. They followed without taking properly into account the costs and the potential dangers.

The spirit of commercial and imperialistic aggressions on the part of the few, however, created among others the necessity for defending their proper interests. Indeed, as in our case, our very security was menaced. We had no alternative but to do our utmost, with the support of other powers holding the same views, to preserve our neighbor from disunion and to stabilize the peace of these regions.



Baron Keishiro Matsui, Japan's New Minister for Foreign Affairs.

While our effort checked and eliminated the more serious dangers from competition in China, it did not strike at the roots and destroy the idea, established in age-old practice, that it was necessary for nations unduly to support their foreign trade with navies and armies. In other parts of the world similar practices continued. It was in that otherwise splendid country, which has given the world so much in thought and science, that the idea that force was a necessary concomitant for foreign trade found its most ardent exponents and its most general approval. Out of the idea of competition, carried to the extreme in Germany, came the great war with its calamity to the world. The states of Europe, and even many other parts of the world, are still suffering, and will have to endure grave hardships for many decades, as a result of that ghastly error.

But at least one valuable achievement has come out of the war. The nations have had an awakening. They have learned the lesson that war does not pay, and, within certain limitations, that armaments are wanton and are even instruments that breed hostility. They have learned that the business that can be gained abroad does not warrant what, in business phraseology, is called the "overhead charges,"—that is to say, the cost of armaments and the maintenance of armed forces beyond the necessities of their own security.

It was with a purged spirit and an experienced common sense that the nations most concerned in the peace and prosperity of the Pacific ocean gathered two years ago at Washington. Agreement among the representatives of the several states was consequently easy to reach, and the treaties were duly and readily ratified. The results of the Washington conference we all know. The great achievement, the first of its kind the world has ever known, was an agreement between the principal naval power to limit the construction of the only character of vessel that can become aggressive. The four-power treaty pledged the governments concerned to enter into conference, discussion, and adjustment over any issue that might threaten to disturb their security in the Pacific. Treaties and understandings with regard to China were agreed upon and accepted by nine countries, giving a further added assurance that the old order of things shall not again prevail in her territory. These are incalculable blessings to us Japanese; and no government that would be likely to impair the spirit, to say nothing of the letter, of those treaties could endure in office in our country.

The relations between the greater powers concerned in the Pacific are now such that business men may have confidence in foreign enterprises not only for to-day but also for the future. They may invest abroad as well as at home with assurance that their efforts are less speculative, as far as international affairs are concerned, than they have ever been in the history of our ocean.

This is particularly a splendid assurance for Japan for we, at the present time, are in a stage of transition from a condition originally agricultural to one that is already largely one of manufacturing, commerce, banking, and shipping. By our understandings with other powers, we are freed of anxiety lest the difficulties that may come during our further transition may be made harder to bear by the possibility of international conflict. We are happily at liberty to work out our domestic readjustments without the dangers of serious foreign complications. And our foreign relations, being thus substantially based, I think I am not too sanguine in my belief that, while not ignoring our shortcomings or over-estimating our abilities, we may look also with assurance to the overcoming of our domestic difficulties and the solving of our economic problems. Without boastfulness, I think I may fairly say that we have character, ability, and wisdom sufficient for our needs, and that our measure of these qualities has been recognized by foreign nations. Everywhere we have friends. No man who has seen what other nations have done for us in our recent catastrophe, spontaneously and without design except to help us as fellowmen, could deny those friendships.

It is not only the business side of the matter—the hard, callous, calculating side, of human nature upon which we can depend. The side of humanity has had even a greater influence in changing the thoughts of nations. During the great war the cry among the soldiers in Europe was—" It shall never happen again "; and the spirit out of which that cry arose is not dead. I am an optimist with regard to humanity. I believe that just as in dealing individually as man to man, so in dealing with other nations, the more successful appeals are to the better qualities. The greatest difficulty is ignorance and suspicion. What men do not know they are inclined to distrust; and suspicions can be easily aroused at times by self-seeking individuals who pretend to have knowledge.

For example, it has been too frequently the case that concession seekers from one powerful country or another have gone into some undeveloped state and obtained rights for profitable enterprises, sometimes in conflict with the interests or the rights of nationals of other states; and unfair appeals have been made to the prejudices of their own people with the object of rallying support on behalf of their private interests. Too often such concessionaires have obtained this support, and the result has been irritation and counter-irritation far beyond justification and far beyond any general national profit that could come out of the enterprise. I am not speaking of any particular case; I am speaking only of the practice. Such practices have been followed in the past in the territories of North Africa, where we have no interests whatever, and in Atlantic states in South America, where we have practically none. It is not only in China that this sort of concessioneering has from time to time developed and caused newspaper and public rallyings of one nation against another. Fortunately, the governments of the greater powers have come to realize—as those of the lesser states have long been compelled to see—that it is often unfair and generally unwise to permit the interests of a single group of their nationals in foreign lands to disturb the friendships of their whole country.

Please do not misunderstand me. I do not mean to advocate the surrender of any fair principle or fair concession or fair business. On the contrary, I think it would be an unwise policy for any government, our own or some other, not to stand firmly in diplomatic support of its nationals in fair and honest enterprises in a foreign country. I mean only to say that the old idea that formerly prevailed with some nations, that it was the duty of a government to support aggressive competition on the part of its nationals, whether fair or unfair, was not only an unjust but likewise an injurious policy. The old principle of justice is a wise one among nations as well as among individual business men.

With specific reference to Japan, what my predecessors and the representative of our country at Washington have said is worthy of again repeating. In competition for trade and concessions for developments that are necessary or valuable in China, we have little to fear from foreign rivalry. The field of China is big enough for all foreign investors and foreign business men. We have not the financial capacity to supply all the capital that China will require for decades to come; nor have we the commercial ability or resources to meet all of China's needs. But we have the advantage of the closest proximity; and if we develop our own ability within and among ourselves to meet the vast requirements of our neighbor, our rightful share of the trade to come cannot fail to come to us. And I believe that in developing this trade, and for the development of it, we cannot and must not fail to achieve the confidence and the friendship of the Chinese people.

It is, happily, a new era upon which we are launched. The world is a wiser place. Men realize that they can with safety and even with profit let their kindlier instincts have fuller play."

Provincial Autonomy in China

Shensi Signs an Arsenal and Mint Contract

By Lawrence Impey

IN December, 1923, the writer published an article in THE FAR EASTERN REVIEW in which he described the proposed irrigation scheme for the Wei-peh area of the province of Shensi, giving at some length the schedule which had been drawn up under the auspices of the *tuchun*, General Liu Chen-hua, and pointing out the extreme value to China of the execution of even one or two such improvement projects. In the article was quoted the estimates arrived at by Chinese engineers who had surveyed the ground, and it was mentioned that the governor had some $500,000 in hand which might be used for this purpose in the event of any co-operation from outside the province, the idea being that possibly the China international famine relief commission might be willing to assist in promoting the scheme. The proposal in the rough was that the commission should be asked to contribute a million dollars, either as a grant or a loan, while the provincial authorities would subscribe the aforementioned $500,000, the whole being estimated as sufficient to carry out the major portion of the plan over a period of two or three years.

Since this information was published, however, the writer has been able to consult various engineers who have recently been on the ground, and has also obtained certain other information from various sources which lead him to very materially alter his views on the matter. In the first place it appears that the political conditions in the province are so unsettled as to render the prices for transportation of materials almost prohibitive, while to this must be added the doubt as to whether the threat of molestation by indisciplined soldiers or bandits would not prevent the carrying out of the necessary field work. A description of conditions by recent eye-witnesses is extremely discouraging in this regard, as the following facts will prove:—

The province of Shensi, though nominally under one control, is in reality divided into five political or military sub-divisions as follows: General Liu Chen-hua is the *tuchun* or military governor, there being no civil administrator at the moment, and he manages to hold down twenty-one *hsiens* or districts under his personal supervision, these being located west of Wei-nan, south of Wei-ho, and west as far as the Kansu provincial frontier. As far as one can judge from reports from foreigners and Chinese these twenty-one *hsiens* yielded no less than eighteen million dollars in taxes during the past year, this money being mostly raised on opium. Of course it must not be supposed that the unfortunates in these *hsiens* are compelled to grow opium by the paternal provincial government. All that is done is to levy a tax of some $10 a mow (one-sixth of an acre), and if the unlucky peasant cannot pay he is pursuaded that he should do so by various unpleasant means, of which inprisonment is the least. It may be deduced, therefore, that if the farmers wish to grow other crops than opium it will be necessary for them to raise the money by such pleasant expedients as mortgaging their property or land, selling their children, or condemning their wives and daughters to a life of prostitution. That the opium is grown in quantities in order to avoid this alternative is evidenced by the prices obtaining in this area, for during the month of November, 1923, the drug was being sold at 65 cents per tael weight throughout the district, while opium pipes, lamps, etc., were exposed for sale in almost every bazaar and market.

On crossing the Wei river from General Liu's territories one finds the eleven *hsien* immediately to the north to be under the control of General Tcheng, who represents General Ho Li-tsun in this area and collects the taxes in the latter's name. It is worth noting *en passant* that the peasantry in this area are far less heavily taxed than they are in the Sianfu districts, as the soldiery are nearly all Shensi men, while those to the south of the river are imported from Honan. Opium is grown here too, though not nearly to such an extent, a witness who examined some seventeen villages testifying that almost all had at least one shop selling the drug.

General Yen Chen-tang controls the four easterly *hsiens*; Tungkwan, Hua Yin, Hua *hsien*, and Wei-nan, and these are reputed to be the richest *hsiens* in the province of Shensi if statistics are to be believed. At present the area is occupied by the twentieth division of central government troops and the first division of the Honan army, and the severity of the occupation inflicted by them must be seen to be believed. Whenever and wherever carts with draft animals make their appearance they are ruthlessly seized, while temples, inns, farms, houses, shops, and buildings of every kind are commandeered, misused, and wrecked without payment. As an example of rapacity one may instance Tungkwan, which with some 11,000 houses has to support a garrison of 6,000, who take everything they desire and pay for nothing. All cart traffic has been stopped on the main road leading through Tungkwan westwards, and what merchandise passes is carried by boat or wheelbarrow. According to the postal commissioner the average freight rate for goods between Kwanyintang at the head of the Lunghai railroad and the provincial capital of Sianfu—a distance of less than two hundred miles—is $130 per thousand *jin* (1,300-lb.) owing to the "protection" taxes levied by the military at Tungkwan. These taxes, which are levied on everything which passes with the exception of the post carts, run as high as $30 per boat plus forty cents a day for each "soldier" put on the boat as escort, while the boatmen are further required to feed their gallant defenders.

Continuing the examination of these political and military areas, one finds that the next one consists of twenty *hsiens* south of the Wei river basin, and that it is held by General Wu Shin-tien with his own military, who from all accounts *vie* with those of General Yen in their endeavors to exterminate the working population of the province. Turning thence to the fifteen most northerly *hsien* we find them to be controlled by a Major Yang with a small force of only some five hundred rifles, and it would appear that his rule is lenient when it is compared with that of most of the other militarist despots.

His districts are certainly poor and mountainous, but by dint of careful management the price of opium is kept down to eighty cents per tael weight, while despite this kindness shown to the rural population a not inconsiderable sum is raised annually by taxation of various kinds.

Thus it can be realized that conditions in the province are not of the best for the successful promotion of philanthropic or engineering schemes, even supposing that it is the intention of the authorities to promote the said schemes in a straightforward and honest manner. Unfortunately it is by no means certain that this will be the case, for competent Chinese and foreign observers are of the opinion that the whole irrigation project for the Wei-peh area is merely intended to increase the growth of opium on the territory thus benefited. Definite documentary proof of this intention is not yet to hand beyond these statements aforesaid, but the writer would wish in this connection to draw attention to recent events in connection with certain negotiations carried out by the Shensi authorities.

Two well-known engineers, one British and one American, made an extended visit to Sianfu and the surrounding districts in the fall of 1923, during which they surveyed parts of the Wei and Yellow rivers, looked over the Wei-peh irrigation scheme, and made an exhaustive examination of the industrial possibilities in the central portion of Shensi. It is due to these gentlemen that we have learnt that the Yellow and Wei rivers between Shanchow and Sianfu are either navigable for steamers or can be made so at slight cost, and in view of the fact that at present freight rates are so prohibitive over this area as to render it cheaper to ship in even such heavy articles as wire nails and piece-goods by parcels post, which is exempt from "protection" taxes, one can only hope that this navigation project will be permitted to come into being, and thus help in some small measure to alleviate the misery which now overwhelms the people.

One may well doubt if this will be the case, however, for although the *tuchun* of Shensi appeared desirous of discussing the irrigation and navigation plans when first approached, it soon became apparent that he was in reality far more interested in the possibility of obtaining an arsenal or a mint, or both combined.

The representatives of various firms were asked to tender for construction plant for these two purposes, but the majority of them were so handicapped by the agreement between the various powers as to the importation of any munitions of war as to be for all intents and purposes out of the running. The following schedule gives some idea of what was required to be tendered for, the total estimate for it being in the neighborhood of $360,000:—

1.	Melting shop with all fittings ..	49 pieces
2.	Rolling mill with all machinery	21 ,,
3.	Sampling room with furnaces	4 ,,
4.	Blank punching machines ..	57 ,,
5.	Mint plant	139 ,,
6.	Cartridge case plant	27 ,,
7.	Bullet machinery	28 ,,
8.	Cap machinery	16 ,,
9.	Loading machinery	16 ,,
10.	Clip-making machinery ..	20 ,,
11.	Gauges and tools	80 ,,
12.	Tools	116 sets
13.	Repair shop	18 pieces
14.	Electric equipment	100 k.w. generator with fittings
15.	Lighting and wiring fittings ..	
16.	Transmission	8 shafts with fittings
17.	Power plant	Engines, boilers, etc.

Of course the chances of the various firms desirous of tendering for such an installation would be in inverse ratio to the view of the legation concerned, for while, to quote an example, one national may be allowed to import a lathe of dubious utility labelled cotton spinning machinery, another may find himself immediately condemned for a precisely similar act. That this is the case is strikingly proved by the circumstances under consideration, for while the British and American firms found themselves prevented from competing by the stipulations put forward by the Shensi provincial authorities, Sino-German interests were able to successfully conclude a contract for a combined mint, arsenal, and electric lighting plant.

It appears that the terms offered by unsuccessful competitors were: 50 per cent. cash with order deposited in a foreign bank, 25 per cent. on landing material in China, and the remaining 25 per cent. in six months after delivery. The Shensi authorities on the other hand demanded either a guarantee by the legation of the national concerned, or a cash deposit of equal amount to the contract to remain for one year as surety that the plant would work properly. The latter clause was obviously outside reason for any competitor, while the former was not available to Americans, Japanese or British.

The writer understands that the final agreement was signed between a Chinese representative on the part of the Shensi authorities and a Sino-German firm operating of Shanghai under a Chinese trade name. The contract calls for the erection of a 500 kilowatt water power plant working the mint and arsenal by day and the electric lighting plant by night, the engines to be 280 h.p. two boilers with superheaters.

Not only must these facts be of the greatest importance to commercial interests in China, but they throw a very illuminating sidelight on politics in this unhappy country, affording an excellent reason for the present conditions of civil war and chaos, which so often appear to puzzle the foreign observer at a distance . It would seem on the face of it that the irrigation scheme previously referred to has but a poor chance at the present time, for Governor Liu Chen-hua has presumably used all his available resources for the arsenal and mint contract, and it is doubtful whether the international famine relief commission or any other body of philanthropic effort will be desirous of investing money in a province which is setting such an undesirable example, to the rest of China and where there is every likelihood that the financial assistance, if rendered, would only promote the growth of opium.

When one considers the existing provincial organizations in Shensi it appears that they are all financially bankrupt, for the road bureau is a hopeless failure, the flour mill is an almost unworkable wreck, while the present electric light plant not only fails to light but is encumbered with a heavy debt, for the payment of which a Hankow firm is pressing at the present time.

The erection of another mint and arsenal is merely another menace to the peace and prosperity of the country, and the Chinese would do well to ask the responsible authorities, if there be any such, by what right such a militarist threat is permitted. General Wu Pei-fu is presumably the person who will benefit most by the scheme for General Liu Chen-hua is his henchman, and he is therefore the one who should be held answerable by the Chinese people.

As far as foreign interests are concerned it is difficult to see what can be done in the matters for although the powers have an agreement as to the importation of the machinery for the manufacture of munitions of war other powers who are not parties to the agreement cannot be held responsible for contracts entered into by their nationals. The signing of this contract is of the gravest import, for the very fact that what is possible to some nationals and not to others tends to disrupt the existing unity of foreign nations which serves to maintain some semblance of governmental authority in China.

Friendly Restrictions

THE determination of the Japanese government to buy all foreign perpetual leaseholds in Yokohama at equitable prices is one against which Americans can make no consistent protest, even if they wished to retain any properties there, says *The New York Times*. The only form of land tenure open to foreigners in Japan will be no longer available, in Yokohama at least. It is implied in the report from Tokio that the United States government surrendered its leases upon two plots in that city, because it did not wish to continue to be responsible for the property. Even if it did, the perpetual leasehold title to these sites, used as a naval hospital and coal depôt, could not have been continued.

Whether or not this Japanese move is related to the recent decision of the United States supreme court in the Washington and California land-lease cases, handed down last October, it is entirely justified and should tend to promote respect for the Japanese people. Their foreign minister, addressing the imperial diet, noted with pleasure that their relations with the United States " continue to follow the path of traditional friendship." An old proverb urged one to love one's neighbor, but none the less not to pull down the hedge standing between the two houses. The traditional friendship between Japan and the United States should not be disturbed by the hedges which delimit the respective fields of the two, and determine the conditions of land tenure on either side.

What the opinion of the supreme court has settled is that the state act forbidding the leasing of land for agricultural purposes to an alien who cannot become a citizen, as well as to an eligible alien who has not declared his intention to become a citizen, is not in violation of the treaty which affirmatively permits the leasing of lands for residential and commercial purposes only. The motive of the restriction, hinted at by the decision of the lower court and agreed to by the higher court, is that one who is not a citizen and cannot become one lacks an interest in and the power to work effectually for the welfare of the state, and so may be properly denied ownership of land. Conceivably, it is urged, every foot of the land might pass to non-citizens. The supreme court decision does not, of course, discuss the wisdom or fairness of such limitation. It merely says that it is not inconsistent with the treaty between the two countries.

This being conceded, there can be no good reason for protest against the Yokohama buying in of our leases. Nor can we interpret it as a disturbance of international concord if, while we make special exemptions in favor of Europeans and persons of African nativity or descent, the Japanese should be disposed to show special consideration for their Asiatic non-white and non-black neighbors across the Yellow Sea, in view of the special relations that exist between Japan and China.

Competition for Machinery Trade of China

By W. H. Rastall, Chief, Industrial Machinery Division, Bureau of Foreign and Domestic Commerce

THE returns published by the Chinese maritime customs covering the trade of China during the year 1922 have now become available and furnish an interesting illustration of the trend of international competition in that market and its influence on other foreign markets.

Returns are usually collected in haikwan taels. As the tael is a confusing unit, entirely theoretical, with a silver basis—and therefore subject to exchange fluctuations that most exporters find confusing—for the purposes of this discussion taels are converted into dollars.

Total Volume of Trade Increased

An examination of the returns show an unusual increase in the total volume of machinery absorbed by China during the years 1921 and 1922. (It is understood that the volume for 1923 is much smaller.) In both 1921 and 1922 China absorbed about 15 times the volume of machinery imported in 1915.

The participation of the different nations in the trade is shown in the accompanying table and chart, which is presented both on a basis showing the volume of the trade from each supplying country in dollars and in percentage.

Participation of Japan and Germany in the Trade

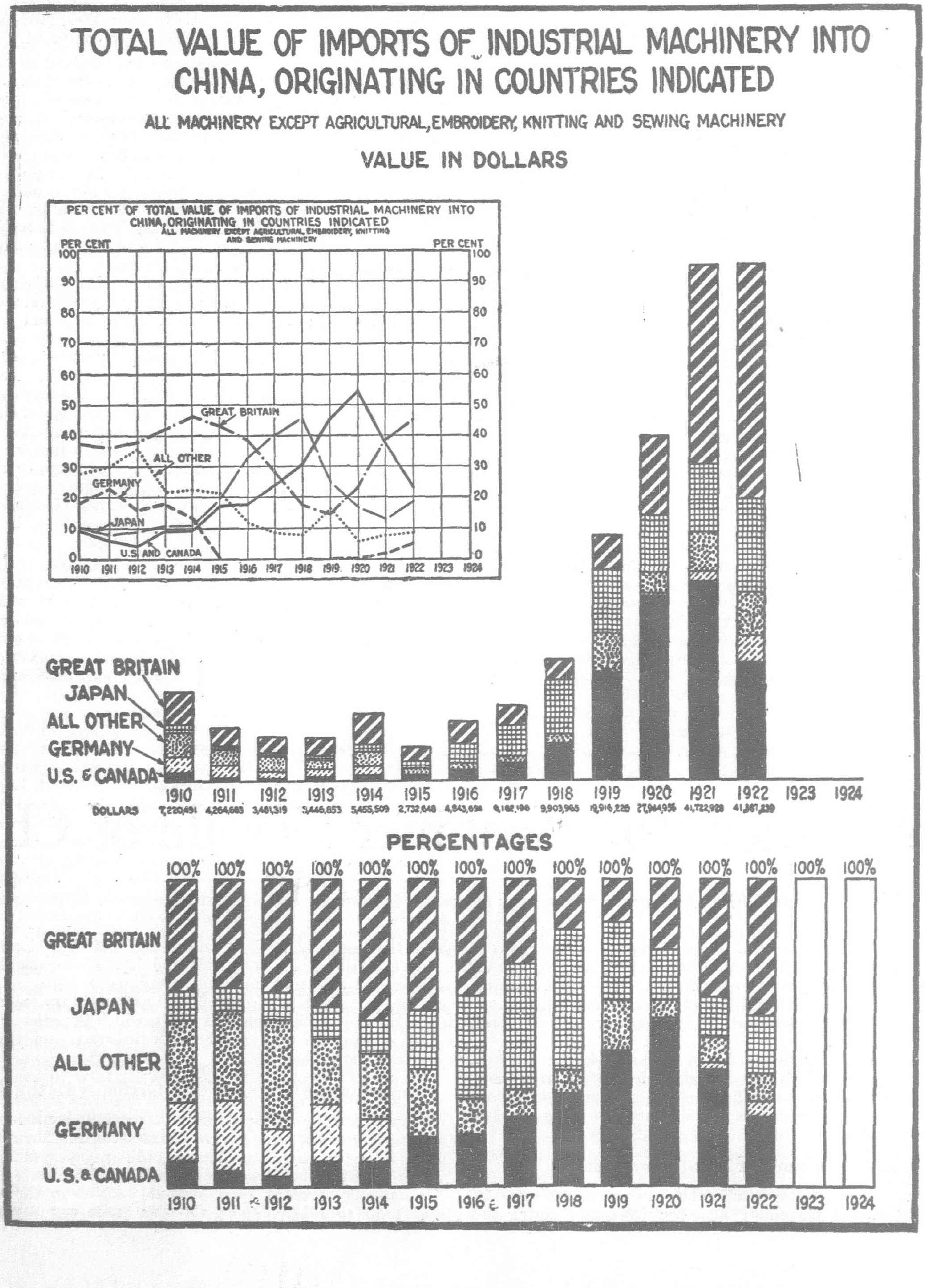
Since 1915 Japan has shown a surprisingly consistent increase in volume of trade, although the character of machinery produced in Japan and marketed in China is ordinarily very different from that produced in such countries as the United States.

Germany occupied an important position in the machinery trade prior to 1914. During the war, trade was negligible, but immediately following the armistice it began to pick up and greatly increased, at least through 1922, but even at its best, in spite of the advantage of the depreciating mark and various official efforts to stimulate the business, in spite of banking and diplomatic support and the advantages of organization in cartels, this trade has not assumed really significant proportions since the war, and the latest reports from China indicate that German competition is losing its potency there. It would appear that American manufacturers will not find the German influence in this market a matter of serious consequence before the political situation of Europe is clarified.

Competition Between Great Britain and America

Evidently the serious competition for the machinery trade of China lies very largely between American and British suppliers. The accompanying percentage chart shows the important position held by British interests in the trade prior to 1917, during which year the American participation was unsatisfactory. Under war influences, however, American participation in this trade increased rapidly, the volume of machinery exports to China being multiplied

(*Continued on page 118*)



Japan's Naval Policy

By K. Nomura, Rear-Admiral, I.J.N.

Rear-Admiral Nomura was formerly Japanese Naval Attache at Washington, and during the Washington Conference, Admiral Baron Kato's personal Aide. He was after on service in the Admiralty in Tokyo, and now commands the Japanese Yangtze Squadron.

ALTHOUGH the facts regarding Japan's naval strength and her naval program have been made public officially and cannot create alarm where there is capacity and willingness to understand them, occasional criticisms of our policy appear in the press, tending to revive suspicion and distrust. As a rule unfair critics defeat their own objects, but once in a while no little prominence and credence are given to arguments that are definitely unsound. For instance, there are the articles of Mr. Hector C. Bywater, a British writer, whose contribution to the "Atlantic Monthly" some time ago was read to the "Congressional Record" and republished in one of the American navy magazines. Men who are informed and unbiased would perceive at once how the arguments are largely trumped up in such writings, but there are so many men in prominent places—as the case in point show—who are inclined to take articles of this nature seriously that I am constrained to try to put the facts in simple form in the hope of discrediting any further attempts that may be made to destroy confidence in Japan and to undo the value of the Washington treaties, the greatest instruments the world now possesses for the maintenance of peace upon the seas.

STATEMENT BY THE MINISTER OF THE NAVY

Because our government is required to make unprecedented appropriations for reconstruction in the devastated area, the navy department, like other departments, has been required again to reduce its budget. On revising our naval program, after the Washington conference, we drafted a proposed budget of Y. 278,000,000 for the fiscal year of 1923 and Y. 279,000,000 for that of 1924. We have now reduced the working budget for this year by Y. 39,000,000 and the proposed budget for 1924 contemplates a reduction of Y. 41,000,000, making our expenditures respectively Y. 239,000,000 and Y. 238,000,000. Of the latter account Y. 126,000,000 is for the ordinary and Y.112,000,000 for the special account.

In our working budgets for 1923 and 1924 the reductions below proposed estimates include Y. 88,000,000 in the construction of auxiliary ships, Y. 13,000,000 in expenditure on land and water equipment, and Y.2,000,000 in expenditure for warship reconstruction.

The estimate of direct naval losses as a result of the earthquake reached a total of Y. 91,500,000. Tokyo district suffered to the extent of Y. 20,000,000, Yokosuka and vicinity Y. 68,500,000, and Hiratsuka and vicinity Y.3,000,000.

The number of our auxiliary vessels, existing and contemplated, is as follows:

Cruisers completed or ordered by July, 1922	**17**
Cruisers ordered thereafter	**6**
Cruisers to be ordered, according to program	**2**

The work of construction has been started on two of the cruisers ordered since last July, the "Kako" and "Furutaka," the laying of the keels of the other four vessels being postponed till all necessary materials are available.

Destroyers completed or ordered by July, 1922	**57**
Destroyers ordered thereafter	**9**
Destroyers to be ordered, according to program	**15**

Five destroyers are being built, the laying of the keels of the other four awaiting the accumulation of necessary materials.

Submarines completed or ordered by July, 1922	**47**
Submarines ordered thereafter	**5**
Submarines to be ordered, according to program	**17**

In the matter of auxiliary ships, in which we are considerably below the ratio of sixty per cent., as compared with Great Britain or the United States, the revised program, arranged last year under the direction of the late Premier Kato, was to be completed in 1928. That date has now been deferred. As is well known, the construction of auxiliary ships is not restricted by the naval treaty, but we always regarded the agreement as one which the signatory powers would do well to observe in spirit as well as in letter. The writings of individuals to the effect that a new naval race had begun in auxiliary construction was never true.

Japanese naval men have been deeply affected by the recent demonstration of sympathy made to our country in its great affliction. The presence of warships in our harbors on missions of compassion, principally warships of powers associated with us in the naval treaty, has made a new and indelible impression upon all Japan.

Let me take up in detail the principal points made in the article in the *Atlantic*—which was the most potent because the most adroit of the several criticisms of the naval treaty that have been offered. The writer says:

> "The Washington conference has undoubtedly been successful in arresting the multiplication of capital ships, but it imposed no veto on the building of other combatant types, save airplane carriers. The result is that to-day, barely twelve months after the acceptance of the limitation treaty, a revival of shipbuilding competition seems inevitable if the balance of power as regulated by that treaty is to be maintained. To state the case in a sentence; Japan, by diverting to the construction of cruisers and submarines no small part of the energy she formerly expended on capital ships, will soon be in possession of a fleet of auxiliary combatant vessels superior in some respects to that of any other power. During the last five years Japan has built or ordered no less than 23 light cruisers, as against a collective total of 16 for the United States and Great Britain."

The effect of this paragraph is to give a definitely erroneous impression. It is carefully worded but seems deliberately designed to alarm where no alarm is necessary.

Let us compare Mr. Hughes' original proposal for the limitation of auxiliary ships, as submitted to the Washington conference, with the present number of auxiliary ships in the possession of Japan, and let us also study the ration of the ships of that category between the United States, Great Britain, and Japan.

Mr. Hughes' original proposal follows:

> "The term auxiliary surface combatant craft includes cruisers (exclusive of battle-cruisers) flotilla leaders, destroyers, and all other surface types . . . .
>
> "It is proposed that the total tonnage of cruisers, flotilla

"leaders, and destroyers allowed each power shall be as follows:
" For the United States ... ... 450,000 tons
" For Great Britain ... ... 450,000 tons
" For Japan ... ... 270,000 tons

" Provided, however, that no power party to this agreement whose total tonnage in auxiliary surface combatant craft on November 11, 1921, exceeds the prescribed tonnage shall be required to scrap such excess tonnage until replacements begin, at which time the total tonnage of auxiliary combatant craft for each nation shall be reduced to the prescribed allowance as herein stated. All auxiliary surface combatant craft whose keels have been laid down by November 11, 1921, may be carried to completion.

" No new construction in auxiliary surface combatant craft except replacement tonnage as provided hereinafter shall be laid down during the period of this agreement, provided, however, that such nations as have not reached the auxiliary surface combatant craft allowances herein-before stated may construct tonnage up to the limit of their allowance."

This, it should be noted, was in the original proposal, not in the terms finally agreed upon and included in the naval treaty. I emphasize this fact in order to show that Japan is living up to the spirit of the original project as well as the letter of the treaty.

Improvements have been made and changes, too, in the number of the auxiliary ships which we plan to construct,—as was publicly announced a year ago by Admiral Kato when minister of the navy. Instead of building nine cruisers of 59,215 tons (which were not yet ordered) and remaining thirty-seven destroyers cf 42,641 tons aggregate tonnage, as originally planned in the eight-eight program, our navy department now proposes to build eight cruisers of 68,400 tons (four of 10,000 tons each and four of 7,100 tons each) and twenty-four destroyers of 33,600 tons in aggregate tonnage—an increase in these styles of ships of 144 tons. The auxiliary craft that were to be constructed in keeping with our eight-eight program were to be completed over a period of several years, concluding in 1927; and naturally this slow construction caused a lack of uniformity in types, which the Japanese naval authorities, as would any other naval authorities, now seek to remedy.

As these auxiliary ships are completed, in the course of the next five years, they will replace the old vessels of the same character till the total strength of auxiliary surface combatant ships in Japan's Navy at the end of 1927 will be 107 vessels of 249,460 tons gross. This, it will be seen, is less by 20,540 tons than the 270,000 tons originally proposed for Japan by Mr. Hughes. It is, therefore, evident that only by refusing to accept Admiral Kato's official statement can the argument be maintained that Japan is directing her energy, formerly devoted to capital ships, to the enlargement of her auxiliary fleet.

Next, the question whether the ratio of 5-5-3 will be disrupted in the event of these auxiliary ships being completed by Japan is answered by a comparison of the strength of the auxiliary combatant craft of Great Britain, the United States, and Japan. The Japanese navy department's figures are as follows:

Table A.—Showing the strength of auxiliary surface combatant craft of the United States, Great Britain, and Japan, at the present time.

Country.	Cruiser.			Destroyer.			Total of auxiliary surface combatant craft.		
	No.	Tonnage	Ratio	No.	Tonnage	Ratio	No.	Tonnage	Ratio
United States ...	23	182,625	1	317	367,388	1	340	550,013	1.
Great. Britain ...	50	259,670	1.42	200	234,960	0.64	250	494,630	09
Japan	25	148,170	0.81	100	77,653	0.21	125	225,823	0.41

Remarks:—The above table shows the present tonnages irrespective of age. It will be seen that, at the present time, the ratio of auxiliary ships in the possession of the United States, Great Britain, and Japan are substantially 5.4 and 5.2 instead of 5.5.3.

Table B.—Showing the total strength of auxiliary surface combatant craft of the United States, Great Britain, and Japan, at the end of 1927.

Country.	Cruiser.			Destroyer.			Total of auxiliary surface combatant craft.		
	No.	Tonnage	Ratio	No.	Tonnage	Ratio	No.	Tonnage	Ratio
United States ...	10	75,000	1	280	334,921	1	290	409,921	1
Great Britain ...	55	299,830	3.9	201	238,720	0.17	256	538,550	1.27
Japan	28	171,055	2.2	92	104,980	0.31	120	276,035	0.66

Remarks:—1. According to the original proposal of the United States presented to the Washington conference, light cruisers shall be replaced by newly completed ships after 17 years from the date of their completion and destroyers after 12 years from the date of their completion, the vessels thus superseded being scrapped. In the above table, therefore, figures are taken of only cruisers that will be not over 17 years old and destroyers not over 17 years old and destroyers not over 12 years old.

2. The number and tonnage of the vessels for Japan are figured out on the assumption that she will complete her replacement before the end of 1927.
3. Those for the United States are figured out on the hypothesis that she will not undertake any new construction except that covered by her 1916 program, which was to be completed in 1924; and the same hypothesis is applied to the case of Great Britain.
4. But it is improbable that these two countries will not construct any new vessel before the end of 1927. Therefore, it will be seen that Japan's proportion is likely to be even further within the 5-5-3 ratio at the conclusion of her building program.

The American navy is not strong in cruiser strength, but, on the other hand, the destroyer strength of the United States is very superior; and it is grotesque to argue that Japan's program of eight light cruisers, to be constructed in the next five years, will give us a menacing predominance. If we should not build these ships our shipbuilding yards, now seriously hampered for want of construction, would be even more seriously injured, and it would be difficult for us to re-organize them in the future than for such highly industralized countries as the United States and Great Brtain to revive theirs.

At the same time that alterations in the program of cruiser and destroyer construction was made, in July, 1922, a charge was made in our submarine program. The number of submarines provided for in the eight-eight program, but not yet ordered, was forty-six, but this number was reduced to twenty-two, which means a decrease of twenty-four in number, or 13,539 tons in aggregate tonnage.

In Mr. Hughes' original proposal, Great Britain and the United States were to have 90,000 tons each and Japan 54,000 tons. In this connection it may be recalled that the Japanese delegate, at the meeting of the conference held on December 24, 1921, made the statement that, so far as Japan is concerned, 54,000 tons is the minimum of submarine tonnage with which her insular position can be adequately defended. The following tables will show what the several nations have in submarine strength at the present time and what they will have at the end of 1927, if we complete our program and the United States and Great Britain do not augment theirs—which again is most unlikely:—

TABLE A.

Showing present submarine strength

	Number	Tonnage	Ratio
United States	133	77,322	1
Great Britain	68	58,540	0.76
Japan	37	24,377	0.31

TABLE B.

Showing submarine strength at the end of 1927

	Number	Tonnage	Ratio
United States	121	84,900	1
Great Britain	76	68,370	0.81
Japan	67	68,536	0.81

Remarks:—The original proposal made by the United States provided that submarines can be replaced by new ones after twelve years from the date of their completion. Therefore, figures are taken of only those that will not be more than 12 years old.

In destroyer and submarine strength, Japan is now far behind other advanced naval powers, and, for the United States and Great Britain, which occupy a superior position as regards the ability to construct vessels of this description, the program of Japan is not such as could possibly cause true anxiety.

With regard to naval expenditures the next table will show that the charge that Japan is diverting her energy, formerly applied to the construction of capital ships, to an expansion of her fleet of cruisers, destroyers, and submarines is a complete fallacy, But the comparatively small savings we appear to be making in money may need the following explanation:—

In the past the expenditure contemplated by Japan, under the eight-eight program and authorized by the imperial diet, had been increased by only 20 per cent. over costs of construction in pre-war days. So light an increase, however, was far from sufficent, and the deficit in construction expenditure had been made up annually by appropriations authorized under a supplementary budget. The government submitted to the imperial diet at its last session a new naval construction bill, which provided for a revision of the expenditure for new construction, as is shown in the table below, and the bill was sanctioned. In that table the margin has been computed with an increase of some ninety per cent. above pre-war prices. Such an ample margin will, it is expected, save the Japanese naval authorities, from going to the diet for authority to make additional expenditure in the form of supplementary annual budgets in the future. It goes without saying that the said revised naval construction expediture includes an item for the conversion of two capital ships into airplane carriers.

TABLE SHOWING NAVAL CONSTRUCTION EXPENDITURE UNDER THE EIGHT-EIGHT PROGRAM AND THAT UNDER THE REVISED PROGRAM.

	1923	*1924*	*1925*	*1926*
Naval construction expenditure under the 8-8 program	Y.147,413,102	Y.147,790,200	Y.143,258,418	Y.113,692,857
	1927			
,, ,,	Y.115,377,355			
Naval construction expenditure under the revised program ...	Y.116,262,479	Y.110,000,000	Y.110,000,000	Y.85,000,000
	1927			
,, ,,	Y.71,054,030			

Japan obviously has no desire to bring about a competition in naval armament. But the Bywater article says:—

> "Less than a month after the Washington conference dispersed, it was announced at Tokyo that an agreement had been come to between the government and the shipbuilders whereby the latter would be provided with other work in lieu of the countermanded battleships and the wholesale discharge of shipyard workers would thus be avoided."

As a matter of fact many thousands of workmen were turned away from the shipyards.

> Then the writer says: "The scheme was to retain practically intact that part of the 1920 program which related to auxiliary ships and to advance the dates of laying down these vessels. For example, contracts for cruisers which it had been originally intended to begin in 1923, 1924, and 1925 were respectively to be ante-dated twelve months, so that normal building programs of 1922, 1923, and 1924 would be in each case increased to that extent. In other words, twice as many auxiliary ships were to be laid down each year as the original program had legislated for. This plan embraced destroyers, submarines, and supply ships, in addition to cruisers."

This is entirely a misstatement. On the contrary, as previously explained, the number of cruisers, destroyers, and submarines to be constructed under the old program has been cut down. Not merely so, but, as may be observed from the foregoing figures representing annual expenditures, new construction alloted to each year under the eight-eight program has been reduced at an equal rate in the revised program for every year until and including 1927.

Mr. Bywater says, "It is patent to everyone that Japan is at present building more combatant tonnage than any other power; but what is not generally appreciated is the fact that she is actually building more tonnage of this description than all the other powers combined."

We confess we are at a loss to comprehend the reason for this gross exaggeration. Japan is now building one cruiser of 5,500 tons each at the shipyard of the Kawasaki Dockyard Company, Kobe, the Mitsubishi Shipbuilding Yard, Nagasaki, and two other dockyards at Uraga and Yokohama, respectively, and one of 3,100 tons at Saseho—five in all of 25,100 tons total. These vessels constitute a part of the auxiliary ship program and were designed to be attached to the eight-eight fleet, the realization of which has now been abandoned in conformity with the naval treaty. At the beginning of this year the United States was completing and constructing 10 light cruisers of 7,500 tons each, and Great Britain two ships of 9,750 tons each, two of 7,550 tons each, one of 5,560 tons, two of 4,765 tons each, and one of 4,190 tons, or eight ships in all (according to a table on page 66 of the Naval Annual for 1923) and some of these have since been completed. Furthermore, the table in question shows that, while the light cruisers already in Japan's possession number 25 of some 100,000 tons, those of Great Britain number 60, representing approximately 310,000 tons. Is it that Mr. Bywater includes Japan's four ships of 10,000 tons each and four of 7,100 tons each, for which the keels are not yet laid down?

Our schedule provides that these ships are to be completed before the end of March, 1923. In Great Britain, three ships of the *Hawkins* class of some 10,000 tons each and two ships of the "E" class of 7,500 tons each have been either completed or are under construction. At first, the ships of the *Hawkins* class were fixed at four, but have since been decreased to three. Besides, Great Britain has the *Courageous* and the *Glorious* of 18,600 tons each. Under such conditions, it should be said that Japan is proceeding rather too slowly in the construction of cruisers of larger type.

The maximum tonnage of the light cruiser has been defined at 10,000 tons at the Washington conference, and in view of a new tendency among the nations of having at their disposal light cruisers of a tonnage approaching the said prescribed maximum, it is right and proper for Japan to adopt a program of completing four 10,000-ton and four 7,100-ton cruisers during the next five years.

Further, the English authority severely criticizes the alleged clandestine actions of Japan in connection with the question of the limitation of Pacific fortifications, saying:—

> "In the fall of 1920, Japan worked out a scheme for fortifying the principal islands that guard the approach to the coast of Japan proper. This measure was intended to counteract the then impending development of Cavite and Guam as first-class bases for the American Pacific fleet. In December, the last of the batteries had been constructed and armed with heavy long-range guns, the barracks, munitions depôts, etc., had been constructed and every navigable approach had been rendered impregnable.
>
> "Meanwhile, the Washington conference had assembled, and Admiral Baron Kato, of the Japanese delegation, had taken the first opportunity to inform his American colleagues that Japan regarded the abandonment of the Philippines and Guam fortifications as the condition precedent to negotiations for the reduction of her shipbuilding program. If the United States would agree to this Japan, on her part, was prepared to suspend her own plans of fortifying her Pacific Islands, and would at the same time co-operate most willingly in any practicable scheme for limiting her floating armaments.
>
> "Baron Kato did not add, however, that Japan, having been secretly engaged in fortifying her island bases for many months previously, had just completed the work."

We do not deny the fact that, with the view of strengthening the defences of our homeland our government devised a plan of fortifying the Bonins, which are situated at a distance of only 500 miles from our coast, and when the disarmament conference was called at Washington the fortification work in these islands was in course of progress. There is nothing strange about that. The United States proposes to set up strong naval bases and forts in the Hawaiian Islands, separated from her homeland by 2,100 miles of water, and Great Britain is considering fortifications at Singapore. But the allegation that, on learning the project on the part of the United States to call the Washington conference, Japan sped up the work of fortifying the Bonins with frantic haste in order that she might gain an advantageous position in the discussion of the question of the limitation of Pacific fortifications at the conference is diametrically opposed to actual facts and is a canard pure and simple. Our budget and financial procedure preclude the possibility of advancing and carrying out in one fiscal year a work destined for the next. Japan saw no necessity of speeding up the work for strengthening the defense of these islands. It should be noted, moreover, that the question of the limitation of Pacific naval bases and fortifications was first taken up when the capital ship ratio question had come to a deadlock.

Japan's attitude toward the conference was plain and above board; she acted openly and fairly throughout at that memorable international gathering, and it is a cause of profound regreat to us that anyone should accuse her of underhand machinations and put a slur on her uprightness and probity. Many things prove that Japan conferred with the other powers in a spirit of candour, justice, and fairness at the conference. It is a case in point that she met with great difficulties in regard to the *Mutsu*. Had she announced officially and in time the completion of that capital ship, previous to the opening of the conference, she wuld have been spared those difficulties.

The British authority describes at length how, being deprived of an opportunity of constructing a strong naval base in the western Pacific, the ability of the United States to conduct offensive operations in that quarter has been frustrated. Some American naval experts are wont to advocate the possession by the United States of a naval strength of 3-2 on the ground that the present state of her Pacific naval bases is anyting but perfect and the line of communication between her homeland and possessions in the western Pacific is long. It would be indubitably convenient for the United States from a strategical viewpoint if whe were in possession of perfectly equipped naval bases that could extend full facilities to the entire American fleet in the western Pacific in case she engages in hostile operations in this part of the globe; still it is none the less needful to view a question of such vital importance jointly with international political relations and from an elvated standpoint, not from a military and technical angle only. Suppose the United States should have built large naval bases with docks, each having a capacity for huge battleships, naval arsenals for their repair, oil tanks, magazines, etc., in the Philippines and Guam and should furnish the entire fleet of her warships with facilities for starting activities at any time in these Far Eastern waters; and suppose that she had insisted on the indispensability of these provisions for the defense of her insular possessions; the American people might have approved but the Japanese would necessarily have taken it as a great menace to their security. If Americans consider the reason for their own purchase of the Virgin Islands from Denmark at the cost of $25,000,000 and also why they cannot welcome the opening of a European naval base in one of the foreign possessions in the Caribbean Sea, they will then, we are convinced, thoroughly understand how the Japanese would not like to see large naval bases built in the Philippines and Guam. "Do unto others what you would have them do unto you." This is not only a maxim for individuals but also for nations. By rejecting at the Washington conference a policy that would have been construed as a minatory attitude toward other countries and by acceptng an agreement on the maintenance of the status quo of the naval bases and fortifications in the in the Pacific, the American delegates secured a harmony of the policies of the powers, which was of paramount necessity for success and contributed in a great measure to promote the progress of mankind toward the ideals of averting armament competition, minimizing the chances of war, and generally uplifting the welfare of the world's peoples.

It seems to us that Mr. Bywater is recommending to the American people the adoption of the so-called "mailed fist" policy, which some of the powers were wont to pursue before the late war.

He concludes his essay with a lengthy statement on commerce raiding. However, the country that would suffer in war from raids on sea-borne trade is not the self-supplying United States but Japan, whose resources are not sufficient to supply her wants at home and whose lines of communication with the Asiatic continent are liable to be menaced—to say nothing of the loss of her entire trade with the United States and the crippling of her communication with Europe. It takes no naval expert to see this, though this authority sees the reverse.

All in all, Mr. Bywater's views are instrumental in provoking distrust of Japan, if not actually intended to do so. But we have faith that men of fair and equitable judgment, if they know the facts, will not give ear to arguments such as his, for whatever reason inspired; and that those who welcome it will be only a minor and jingo section of the American people. It is the firm determination of the American people. It is the firm determination of us Japanese, now that amicable relations have been established among the great power through the Washington conference, to do our utmost for their preservation and consolidation, and it is with this object that I have written.

Competition for Machinery Trade of China

(*Continued from page 114*).

many times, and this expansion as expressed in dollars continued through 1921, though as expressed in percentage the participation of the United States and of Canada decreased from that of 1920. In 1921 the share of business secured by British manufacturers was almost exactly equal to that attained by American producers, each securing practically 40 per cent., but in 1922 the American participation in this trade shrunk to about 23 per cent., while the British expanded to approximately 44 per cent.

American manufacturers should give serious attention to this matter as it may be indicative of tendencies in other foreign markets. Careful thought should also be given to sales effort. It would seem that unless American machinery is supported in the world's markets with more aggressive and consecutive salesmanship, our engineering products would fail to hold the position in those markets that their superior engineering merit deserves.

Chinese Practice to be considered

It is true that the situation cannot be expressed with a simple diagram and a few crooked lines on a chart, for in China the machinery trade is largely influenced by railway, mining, and other enterprises held by concessionaires who are required, in at least some instances, to purchase their engineering materials from the countries that originally furnished the capital on which the enterprises were developed, and, in such markets as Japan, where greater freedom exists, the British participation has not been so important. There are also a large number of other factors that might be introduced in this discussion, but the fact remains that American manufacturers should give thoughtful attention to the position they are coming to occupy in all foreign markets.

The following table shows the total value of imports of industrial machinery into China, and the countries of origin of such imports:

Total Value of Imports of Industrial Machinery into China.

[All machinery except agricultural, embroidering, knitting and sewing machinery.]

Year.	From Great Britain.	From Japan.	From Germany.	From all other countries.	From United States and Canada.	Total.
	$	$	$	$		$
1910	2,661,983	686,356	1,295,789	1,935,700	640,663	7,220,491
1911	1,514,635	302,329	964,132	1,235,232	248,335	4,264,663
1912	1,304,557	287,471	524,379	1,231,858	133,054	3,481,319
1913	1,439,024	360,738	606,643	736,019	304,429	3,446,853
1914	2,511,930	571,466	707,893	1,207,836	456,384	5,455,509
1915	1,180,786	516,783	3,690	578,075	453,314	2,782,648
1916	1,857,174	1,572,914	6,844	554,724	852,038	4,843,694
1917	1,698,335	2,492,407	......	517,970	1,453,475	6,162,196
1918	1,655,141	4,498,085	......	738,921	3,011,818	9,903,965
1919	2,882,815	5,010,817	......	3,115,853	8,906,741	19,916,226
1920	6,483,992	4,622,237	82,278	1,651,534	15,104,914	27,944,955
1921	16,163,447	5,428,043	731,227	3,288,667	16,111,544	41,722,928
1922	18,541,803	7,585,592	2,095,516	3,507,039	9,657,289	41,387,239
			Percentages.			
1910	36.9	9.5	17.9	26.8	8.9	......
1911	35.5	7.1	22.6	29.0	5.8	......
1912	37.5	8.3	15.1	35.3	3.8	......
1913	41.7	10.5	17.6	21.4	8.8	......
1914	46.0	10.5	13.0	22.1	8.4	......
1915	43.2	18.9	.13	21.17	16.6	......
1916	38.4	32.5	.14	11.36	17.6	......
1917	27.6	40.4	......	8.6	23.4	......
1918	16.7	45.4	......	7.5	30.4	......
1919	14.5	25.1	......	15.7	44.7	......
1920	23.2	16.5	.3	5.9	54.1	......
1921	38.7	13.0	1.8	7.9	38.6	......
1922	44.8	18.3	5.0	8.6	23.3	......

Developments in the Far Eastern Steel Industry

1. Troubles of the Han-Yeh-Ping

THE next two years promises some interesting developments in the Far Eastern iron and steel industry. According to reports in the vernacular press, the great Han-Yeh-Ping enterprise is in financial straits and may be taken over by the Japanese, in which case Japan will practically control the blast furnaces and steel mills of China. The affairs of this company are reported to be in such a tangled condition that it is difficult for any one but an expert with full access to the accounts to unravel the facts surrounding its financial adventures of the past decade. The Han-Yeh-Ping Company started early in its career to borrow funds and after a few preliminary loans from Europe or America, turned to Japanese interests for financial assistance. As usual, however, where Japan is concerned in any industrial loan to China, her motives are distorted into some fantastic allegation that she harbors designs on the sovereignty of the country or intends to wreck the enterprise. Why the keen financiers of Japan would deliberately throw away their hard-earned millions in wrecking Chinese enterprises and then invest an equal or greater amount to restore them to a profitable working basis, is difficult for any but a warped mind to understand or explain.

Anti-Japanese Propaganda

It is within our knowledge that sometime about 1910 an American steel expert made a very careful examination of the Hanyang Iron and Steel Works and reported to his superiors in New York that the plant was obsolete and inadequate as security for a large loan and furthermore, in order to compete with foreign mills at a profit, it would have to be remodeled or completely rebuilt. European experts made similar reports on the property as it then existed. Despairing of obtaining financial assistance from these quarters the Han-Yeh-Ping Company turned to Japan. The Japanese at that time faced an industrial future with a very limited supply of iron ore within their own domains and were seeking an assured supply from abroad. When the Chinese in 1913 asked them for a further large accommodation it was stipulated in the loan agreement that during its life of forty years the Han-Yeh-Ping should supply a minimum of 400,000 tons of ore and a maximum of 600,000 tons at a basic price of $3.00 (Mex.) a ton delivered at the Yangtze.

This exceptionally fair agreement has been held by anti-Japanese writers as constituting irrefutable evidence that Japan was seeking to wreck the enterprise preliminary to demanding control.

In any discussion of Japan's special interests in the Han-Yeh-Ping enterprises common fairness demands that certain facts be kept always in mind. The alleged wickedness of her transactions would seem to consist in tieing the company down in a contract to supply a stipulated tonnage of iron ore over a period of years at a fixed price and that owing to war conditions the contract could be carried out only at a heavy loss. Now when the contract was entered into in 1913 the ruling price of pig iron had varied little over a long period of years. There was no reason to believe at the time that a world upheaval was coming in 1914, that would completely upset normal market conditions and prices, especially with an enterprise which operated one of the largest open-cut mines in the world and in a country where no matter what might happen, a plentiful supply of the cheapest kind of cheap labor was always procurable. Whatever price was agreed upon for iron ore or pig in 1913 could never have been greatly modified by purely local conditions and when the Yokohama Specie Bank advanced a loan to the Han-Yeh-Ping on the condition that 400,000 to 600,000 tons of ore be supplied to Japan annually at $3.00 mexican per ton, an enormous profit was left to the company out of which it could easily have repaid the loan long before maturity.

This statement is fully borne out by the figures given by Mr. Chung Yu-wang in a paper read before the American Iron and Steel Institute on October 26 of last year. Mr. Wang gives the detailed cost of a ton of iron ore delivered at the wharf at Taiyeh during 1913 as approximately $1.00 mexican per ton. When the Japanese agreed to pay the Han-Yeh-Ping three dollars per ton delivered at the wharf in the same year, it left a margin of two dollars or a yearly profit of from $800,000 to $1,200,000 on the ore contract alone. This extremely liberal price disproves the contention that Japan sought to ruin the Han-Yeh-Ping and provides evidence that it was solely concerned in obtaining an assured supply of ore at a fair price that would enable the Chinese to live up to the terms of the contract and repay their obligation from the immense margin of profit. The costs were naturally increased during the war, but if we again accept the figures submitted by Mr. Wang at no time up to 1919 did they exceed the price paid by Japan. He says that the cost of a ton of Taiyeh ore delivered at the wharf at the Yangtze in 1919 was $2.80 (mexican) including interest and depreciation, still leaving the company a margin of twenty cents a ton, equivalent to about six per cent. profit. He is also responsible for the statement that within the past year the company of which he is the technical head, has entered into a contract with the Hupeh government mining bureau operating the Elephant Nose Mine at Taiyeh to deliver at the Taiyeh wharves 60 to 70,000 tons of ore based on 60 per cent. iron content at $3.60 per ton.

The peculiar conditions surrounding the Japanese contracts with the Han-Yeh-Ping have been lost sight of in the popular craze to condemn her policies in China especially in her attitude during the negotiations over the twenty-one demands, where the Chinese government under pressure agreed to give its permission in the event that the Han-Yeh-Ping Company and the Japanese capitalists agreed upon co-operation. It also agreed not to confiscate the properties of the Han-Yeh-Ping or convert it into a state enterprise, nor cause it to borrow and use foreign capital other than Japanese.

Only one who has an intimate knowledge of how the Peking and Nanking governments compelled private enterprises during 1912 to raise funds for government use can fully appreciate the motives behind the Japanese demand. There was nothing to prevent the Han-Yeh-Ping from raising additional loans on their properties from other foreign sources and destroying the security pledged to Japan. Now when foreign capitalists advance millions to a private Chinese enterprise and the latter is obligated to furnish in return some commodity of prime necessity to the industrial life of the lending country, and a war intervenes which makes it vital that the terms of the contract be fulfilled, there is some justification for insisting that nothing be permitted to arise that will vitiate the contract. In view of the general laxity of the Chinese government in contracting foreign loans on securities or revenues previously pledged for the service of other obligations. Japan cannot be too harshly condemned for taking drastic measures to protect her investment in the Han-Yeh-Ping.

Had she not done so it is a foregone conclusion that the Peking government would have forced the company to contract other engagements which would have deprived Japan of her main source of iron supply and destroyed the security for her loans. These facts would indicate that if the Han-Yeh-Ping has been unable to live up to the terms of its contracts with Japan the fault does not lie entirely with the latter. The fact remains, however, that the Han-Yeh-Ping is facing a serious crisis. If the company is wrecked as we are told it will be, certainly the people who have consistently advanced millions to save it cannot be held responsible, nor can they be condemned for taking energetic steps to protect their investment from being made a source of international friction through being pledged as security to other foreign capitalists.

Japan's Losses in Seeking Iron

The Han-Yeh-Ping may go under or it may be infused with new life but in either case it means a further large investment on the part of the Japanese bondholders. Professional critics of Japan overlook the fact that the failure of the Han-Yeh-Ping to live up to its contract with the Yokohama Specie Bank has compelled Japan to invest millions in developing other sources of iron supply to meet her increasing requirements. Had the Tayeh properties developed the maximum output of ore they would have been able to supply not only the requirements of China but of Japan as well and at a considerable profit to the company, despite the rise in prices due to the war. The failure of the Han-Yeh-Ping to meet the requirements of Japan at a most critical time in world history when Japan's very existence might well have hinged on her ability to obtain iron ore in large quantities, compelled her to establish the Anshan Iron Works in Manchuria, the Mitsubishi Works at Kenjiho in Korea and to exert every effort to gain control of other deposits in China. The Lungyen blast furnace although nominally operated by a purely Chinese company has as its director general, Mr. Lu Chung-yu, one of the foremost pro-Japanese officials in the country. The Liu Ho-kou Mining Company which recently acquired the blast furnaces of the Yangtze Engineering Works at Hankow is directed by Mr. Tsao Ju-lin another intensely pro-Japanese official. Whether Japanese capital is interested in these concerns or not may be difficult to establish, but there can be little doubt that the closest friendly relations exist. It may be an exaggeration to state that Japan controls all the blast furnaces in China, but it is well within safety to say that in the event of an emergency she would receive preferential treatment of the output of the larger Chinese-owned iron mines and the products of Chinese-owned blast furnaces.

The Anshan properties alone have cost the South Manchuria Railway Company to date over Y.35,000,000 and another Y. 20,000,000 will probably be expended in the next year to remodel the plant for the new reduction process in order to save the original investment. The Mitsubishi Iron and Steel Works in Korea are capitalized at Y.30,000,000; Okura and Company have $7,000,000 locked up in the Penchihu iron mines and blast furnaces and other millions have been paid over at various times to Chinese authorities for the acquisition of concessions and properties in other parts of China. It is not far from the mark to say that Japan has been compelled to invest over Y.100,000,000 in developing sources of iron supply in China because of the failure of the Tayeh mines to deliver the tonnage contracted for in 1913. Every cent of this huge expenditure could have been saved had the Tayeh properties been developed along lines that would have met the requirements of Japan. Much has been written about Japan's schemes to control the iron supply of China. This brief outline of hard facts will help dispel some of the erroneous ideas about Japan's designs upon the integrity of China through control of her iron mines and will help open-minded people to understand why she is entitled to every consideration from other foreign interests because of the huge sums already sunk in China in the vain effort to protect her vital interests.

A 200,000 Ton Steel Mill Project at Anshan

In our November, 1923, issue we presented the outline of the new hematite reduction and magnetic separation process invented by Mr. T. Umene, superintendent of the Anshan Iron and Steel Works operated by the South Manchuria Railway Company at Anshan in Fengtien province. It is now accepted that the adoption of this process will enable the low-grade ores of the Anshan region to be economically treated and on the strength of the trials the S. M. R. is preparing to enlarge the Anshan works in the course of the next two years to a producing capacity of 200,000 tons of pig iron per year, while similar investigations have been carried forward which are to be made the basis of for establishing a steel works producing 200,000 tons per year.

The success of a steel industry in Manchuria would depend largely upon the ability of the Japanese manufacturers to supply the home requirements. According to a report of the S. M. R. investigators the Japanese manufacturers have a very strong combine in which are associated the following companies: The Kokura Steel Works under the Asano management, the Tokai Steel Industry Company at Wakamatsu, the Tokuyama Foundry of the Osaka Steel-Plate Company, the Hyogo Works of the Kawasaki Dockyard Company, the Kobe Steel Works, the Osaka Iron Manufacturing Company, the Plate Mill of the Asano Dockyard, the Japan Steel Pipe Company, the Tokyo Steel Company, etc. At all these works about 200,000 tons of billets, blooms, slabs, plates and small sized products are turned out annually. To make up the partial deficiency in Japan's consumption, the government steel works at Edamitsu is able to furnish about two to three thousand tons per month for private use and the balance must be imported. This opens a very wide field for a new Japanese plant in Manchuria to manufacture the smaller and medium sized steel products used in the Japanese market.

The government plant at Edamitsu and the Tokuyama Works of the Osaka Iron Plate Company are the only two plants in Japan turning out steel plates, the total production being only 30,000 tons per year. The Kawasaki Dockyard Company is reported as planning to expand its Fukiai Works to an output of 120,000 tons of steel plates per year and as the consumption in Japan is placed at 100,000 to 150,000 tons per year, these mills would about take care of the demand if the Kawasaki project is carried out. In the matter of steel rails Japan consumes about 80,000 tons per year, of which 30,000 are supplied by the Edamitsu Works and the balance imported. The demand for new rails in Manchuria would keep pace with railway construction and granting that this would proceed at the rate of 100 miles a year the demand would not exceed 20 to 30,000 tons which would hardly warrant the great investment for a rail plant at Anshan. The S. M. R. is now conducting investigations of its own at the ports of entry in Japan checking off the shapes and sizes of imported steel products in order to have a more accurate basis on which to plan the scope of the new steel works.

According to the trade returns of Japan the importation of "T" and angle iron and steel for 1921 was about 145,000 tons, and in meeting the demand for these products the S. M. R. hopes to make a success of a steel plant at Anshan.

The Electric Steel Plant at Dairen

An industry which is forging ahead with little noise is to be found located near the Electric Park in Dairen, and as usual with other progressive enterprises in Manchuria the initial expense has been largely borne by the South Manchuria Railway Company. For many years the S. M. R. maintained at this point a metallurgical experimental institute but in 1918 turned over its equipment to a Sino-Japanese concern called the China Electric Metallurgical Company, Ltd., which has since been turning out high-tempered tool steel for the market in Manchuria and Japan. The works are under the direction of Mr. K. Kamijima a Japanese engineer and inventor who has developed processes along strictly original lines which find no parallel in Japan. It is claimed that his high-tempered steel products have no equal in the world and it is said that in time his inventions will introduce a new epoch in steel manufacture. For the present the works are turning out five kinds of high-tempered steel, two kinds of stainless steel, two kinds of electric resistance steel and a magnetic steel.

The inventor is now working on steel for armament use, special cast steel and an anti-friction alloy and the results obtained are so satisfactory that within a short time full details will be published by the company. The works are still largely in the experimental stage and have been accommodated with working capital from time to time by the S. M. R. They are far from being fully equipped owing in the first place to the low demand for high-grade steel in Manchuria and because it had neither the time or the resources to develop a market for its products in China or Korea.

The products of the company are, however, attracting the attention of the industrial world in Japan and are in increasing demand and it is now hoped that in a short time the works will be considerably expanded. The following patents have been taken out in Japan: (1) Patent No. 2,988. Process for manufacturing high-tempered steel. (2) Patent No. 40,316. Process for manufacturing special high-tempered steel containing vanadium, cobalt and molybdynum. (3) Patent No. 50,921. Process for manufacturing low carbon ferrochrome.

An application for another patent is on file for a process of manufacturing an alloy for electric resistance. The application for patent number 64,626 for the manufacture of special high-tempered steel has already been granted. Many of these products as yet have never been produced in Japan and as the output of the Dairen works is pronounced as good if not better than imported products it is hoped that Japan in time will be releaded from further reliance upon foreign makers.

The company also operates a small plant in Tokyo under the name of the China Tool and Machine Company, Ltd., which utilizes the products of the Dairen plant for the manufacture of tools and machines.

The New Steel Plant and Rolling Mill at Pootung

The difficulties which attended the operation of the Han-Yeh-Ping Works and the delay in starting other enterprises has provided the opportunity for a new company to enter the field. A company known as the Woo Ching Iron and Steel Company with offices at 24 Kiangsi Road in Shanghai has erected works located on the Pootung side of the Whangpoo River opposite the Kiangnan Dockyard. This plant has been in process of development since 1917 when Mr. Lo Pak-hong installed the original blast furnace with a capacity of 350 tons of pig per month. The initial cost was only $80,000 and the output, sold at Taels 250 per ton, enabled the owner to pay for the plant in three months. A second and larger furnace of 1,000 tons monthly capacity was then installed, constructed entirely from local materials turned out in local Chinese engineering shops but under the direction of German engineers. The plans were drawn up by Mr. E. Kocher of the Siemens China Company and the work superintended by Dr. M. Bruecher, technical manager of the same company, while the contract was carried out by Mr. Li Kok-king.

With the installation of the blast furnace a steel works and rolling mill were added which will turn out monthly about 1,200 tons in bars, billets, T's, bamboo-steel, bars for reinforced concrete and light rails up to 26 pounds in weight. The equipment embraces two Siemens-Martins ovens and a rolling mill supplied by the Siemens-Rhinelbe-Schuckert Union through their China agents, the Siemens China Company. One of the ovens will have a capacity of 12 tons per day of seven hours and the larger one of 35 tons per day of ten hours, a combined monthly capacity of 1,300 tons.

The company has its own ore supplies in Chekiang province and is connected with the Ihua Iron Mining Company of Wuhu. The power required for the plant, about 1,000 kilowatts, will be supplied by the Chinese Electric Power Company of Nantao. The original capital of the company $80,000, was increased in 1918 to Taels 250,000 and in 1921 to Taels 1,000,000 of which three-quarters has been paid up. The cost of the new plant is Taels 900,000.

The company is a purely Chinese concern operating under a license from the ministry of communications with Mr. Loh Pa-hong as managing director but the manager and assistant manager will be German. Local steel requirements are estimated at 60 to 80,000 tons a year and with its output of 12,000 tons the company expects to find a ready market for its products. It is also equipped to make the larger steel castings for ships and machinery and cast iron and steel pipes.

The Singapore Steel Plant

Another interesting development in the Far Eastern steel situation is the erection of a steel plant at Singapore by the United Engineers, Limited, the strongest engineering firm in Malaya. This company, so widely known throughout the Far East, is an amalgamation of the old firms of Riley, Hargreaves & Company and Howarth, Erskine & Company, Ltd. For many years the latter company maintained an office in Shanghai and carried out several important engineering works, amongst which was the erection of the Garden Bridge, one of the most difficult problems our local engineers had to contend with.

One of the most significant engineering developments in Malaya is the building of huge dredges for working the tin deposits for which that part of the world is noted. Most of the placer workings have been exhausted and for Malaya to retain her lead in tin production, the mining companies must now go down to bed rock. In order to meet this new situation, the United Engineers, Ltd., have equipped their plant at Singapore to build dredges and at the present time are constructing three of the most powerful yet ordered for work in the Malayan peninsula.

In connection with this they have also installed a complete steel plant which though of modest capacity, is fully equipped to handle the work for the mining, rubber, shipping and other industries of that region. They are already turning out cast steel gear wheels, bushes and clutches, screen rollers, pads, etc., for dredges, press tops for oil mills, valves for compressors, stone crushing jaws and other castings.

* * *

The Iron and Steel Industry in China

By Chung Yu-wang, Head of the Technical Department, Liu Ho Kou Mining Company, Peking, China.

Paper read before the American Iron and Steel Institute.

Indications show that the people of the United States have awakened to the idea of the great possibilities of foreign trade in the Far East. Hence I hope this paper, in which I shall try to set forth in as succinct a manner as possible a few of the salient points about the iron industry in China, may further awaken their interest in one of the great basic industries of a nation; that is, the iron industry in China.

Let me, first of all, give you an idea of the iron ore as well as an estimate of the reserves in China. The following estimate of ore reserves of the iron deposits so far known in China, suitable to modern blast furnace work as regards type, character and situation (excepting those scattered and unimportant sedimentary deposits found in almost all of the provinces of China, which may amount to 300,000,000 tons and which are only adaptable for native furnace work) shows the quantity to be in the neighborhood of 600,000,000 tons.

The iron ore reserves, as estimated by V. K. Ting, director of the Chinese geological survey, with, however, minor alterations, are as follows:

Provinces	Iron Ore	Theoretical Iron Content
Chili	86,469,000	42,896,000
Fengtien	287,580,000	105,205,000
Shantung	22,920,000	14,138,000
Honan	3,400,000	1,640,000
Anhwei	27,500,000	13,525,000
Kiangsi	18,260,000	8,771,000
Hupeh	52,687,000	30,095,000
Kiangsu	39,080,000	20,787,800
Fukien	15,000,000	7,000,000
Chekiang	2,300,000	1,050,000
Total Tons	555,196,000	245,107,800

If we include the 300 million tons of scattered and unimportant sedimentary deposits, we find that China has about one twenty-fifth of the reserves of the world, one-fourth that of America, eight-tenths that of England and one-third that of France or Germany before the war. Looking from another angle, if we should take the per capita consumption of iron in China to be equal to that in the United States, that is 600 pounds per capita, based upon pre-war production, we would have to face the consequence of exhausting the 900 million tons of ore in about four years. Again let us inquire into the iron ore reserves of China in relation to the area of the country. It has been assumed, first by Sjorgren and then by Eckel, that the resources of iron ore of known countries are proportional to their areas, that is 1,646 tons of ore per square mile of territory. Now, taking the combined areas of China proper and Manchuria to be 1,896,000 square miles, we should expect to have, according to the above assumption, about 3,120,000,000 tons of iron ore as reserves. In reality there are only about 900,000,000 tons, that is about one-third or one-fourth what there should be. The annual production of pig iron by the modern furnaces in China will soon reach the 1,000,000-ton mark, if the iron market continues to improve and if the concrete proposals that have been made soon materialize.

The following is a list of iron works existing or proposed, with their maximum production and their present production:—

Name of Company	Locality of Furnace	Maximum Annual Production	Estimated Production for 1923	Remarks
Han-Yeh-Ping Co. ...	Hanyang ...	216,000	100,000	
Han-Yeh-Ping Co. ...	Tayeh ...	324,000	90,000	
Liu-Ho-Kou Mining Co.	Hankow ...	36,000	30,000	
Pen Hsi Hu Coal & Iron Co.	Pen Hsi Hu, South Manchuria ...	91,000	20,000	
Lung Yen Co. ...	Western Hills, Peking ...	90,000	—	Will be blown in next year.
Kai Lan Mining Administration ...	Ching Wan Tao ...	*90,000	—	Under consideration.
Anshanchan	Mukden ...	100,000	*20,000	
Total, Tons ...		947,000	260,000	

It is well known that pig iron is still produced in small native furnaces in nearly all of the provinces of China. An estimate of the approximate production of ore and native pig for the year 1915 gives 499,810 tons for the former and 108,330 tons for the latter.

Regarding the conditions making for the curtailment of production at the present time, I shall have a word to say later on.

The following table shows the chemical composition of the pig iron produced in the various works:—

Name of Company	Si	S	P	Mn
Yangtze Foundry Pig No. 1 (Liu-Ho-Kou Co.) ...	2.50 to 3.00%	0.03% Max.	0.05 to 0.15	0.5 to 0.7
Han-Yeh-Ping Co., No. 1	2.0 to 4.0 %	0.03 to 0.08%	0.25 to 0.33%	0.60 to 2.00%
Pen-Hsi-Hu, No. 1	——	.012 to .047	0.07	0.40

Regarding the cost of mining iron ore in China, it is apparent that this will vary according to location and type of ore deposit. Let us take the Tayeh Iron Mine as a representative type of mining on a large scale. The cost of mining and transportation (about 28 km. from the mine to port of shipment) was about $1.00 Mex.† per ton in 1913, itemized as follows:

	Taels
Salary	0.154
Labor and material	0.241
Transportation	0.074
Loading	0.112
Miscellaneous	0.143
Total	0.724—approximately $1.00 Mex.

In 1919, due to rise in cost of material and labor and including interest and depreciation, the cost per ton at port of shipment was $2.80 Mex. I presume the present cost varies slightly around this figure.

The cost of mining in the various small and scattered deposits in Hunan, to supply ore to the native furnaces, varied from $0.672 Mex. up to $3.36 Mex. per ton.

It will be interesting to you to know the conditions under which contracts for ore delivery have been made in China. Japan has been the largest buyer of Chinese iron ore, the quantities ranging from 300,000 tons to 600,000 tons per year. Under the terms of an agreement with the Han-Yeh-Ping Co., involving a series of long term loans from Japan, there are specified the following restrictions as to the grade of ore to be delivered, f. o. b. steamer at Tayeh at $3 (Mex.) per ton, with 5 per cent. additional for shortage:—Iron content based at 65 per cent.; for every increase of 1 per cent., a premium of 10 cents Mex. is given; for every decrease of 1 per cent., a deduction of 10 cents Mex.; refusal, if 50 per cent. or less. Manganese content based at .5 per cent.; for every additional .1 per cent., a premium of 10 cents. Phosphorus, at .05 per cent.; for each decrease of 01 per cent., a premium of 10 cents; for each increase of .01 per cent., a deduction of 10 cents; refusal, if more than .08 per cent. Sulphur, .1 per cent.; for each additional .1 per cent., a deduction of 5 cents; refusal, if more than .5 per cent. Copper, .4 per cent.; refusal if more than .4 per cent. The average sizes of ore should be between 75 mm. and 150 mm.; and any sizes less than 25 mm. are rejected.

Recently an agreement has been concluded between the Hupeh government mining bureau, operating the Elephant Nose Iron Mines at Tayeh, and the Liu Ho Kou Mining Company, operating the Yangtze Blast Furnace, for the supply of between 60,000 tons and 70,000 tons of ore at $3.60 (Mex.) f. o. b. lighters at Tayeh, under the following terms as to the quality of ore supplied:—Iron content based on 60 per cent. to 62 per cent.; for every 1 per cent. above 62 per cent., an increase of 10 cents; for every 1 per cent. below 60 per cent., a deduction of 10 cents; refusal, if below 50 per cent. Manganese, .5 per cent.; for every .1 per cent. above .5 per cent. an increase of 10 cents. Silica, up to 10 per cent.; for every 1 per cent. above 10 per cent., a deduction of 5 cents; refusal, if above 20 per cent. Phosphorus .05 per cent.; for every increase of .01 per cent., a deduction of 10 cents; for every decrease of .01 per cent., a premium of 10 cents; refusal, if above .1 per cent. Sulphur .1 per cent.; for every increase of .1 per cent., a deduction of 5 cents; refusal, if above .5 per cent. Copper, .2 per cent.; refusal, if above .2 per cent. The weight of the ore delivered is calculated on the dry basis, with 2½ per cent. additional for shortage. In this connection, I should like to mention the use of the following empirical formula, which has been developed by me, and accepted in principle by the bureau of the mines, for the settlement of the price paid for the ore delivered this year.

Let x=price of pig iron when the original contract was signed.
y=price of ore, agreed upon when the contract was signed.
z=price of pig iron (local market) when readjustment of price of ore is made.
w=a constant.
A=price of ore in $ Mex. delivered f. o. b. Tayeh at the time when the yearly readjustment is made.

$$A = Y - \frac{\left(Y - \frac{Z}{X} \times Y \right)}{W}$$

In this case X=Tls. 70, being the local price of pig iron in 1919 when the agreement was signed: Y=$4.10 being the price agreed upon at that time: Z=Tls. 35, being the price of pig iron at the beginning of this year: W=4 arbitrarily fixed, since the cost of ore for one ton of pig iron is about one-quarter of the total cost of smelting.

$$A = 4.10 - \frac{\left(4.10 - \frac{35}{70} \times 4.10 \right)}{4}$$

=$ 3.588 (Mex.) say $3.60, which is the ruling price for ore finally agreed upon for this year.

I do not know whether there is any such formula for the adjustment of price of iron ore in America.

Cost of Iron Manufacture in China

Cost is a thing very fluid, and is not easy for one to hold for any length of time. It varies from time to time as it depends upon so many variables. So with the cost of iron manufacture in China, as well as elsewhere. Its usefulness lies in giving us a comparison and in the forecasting of future costs.

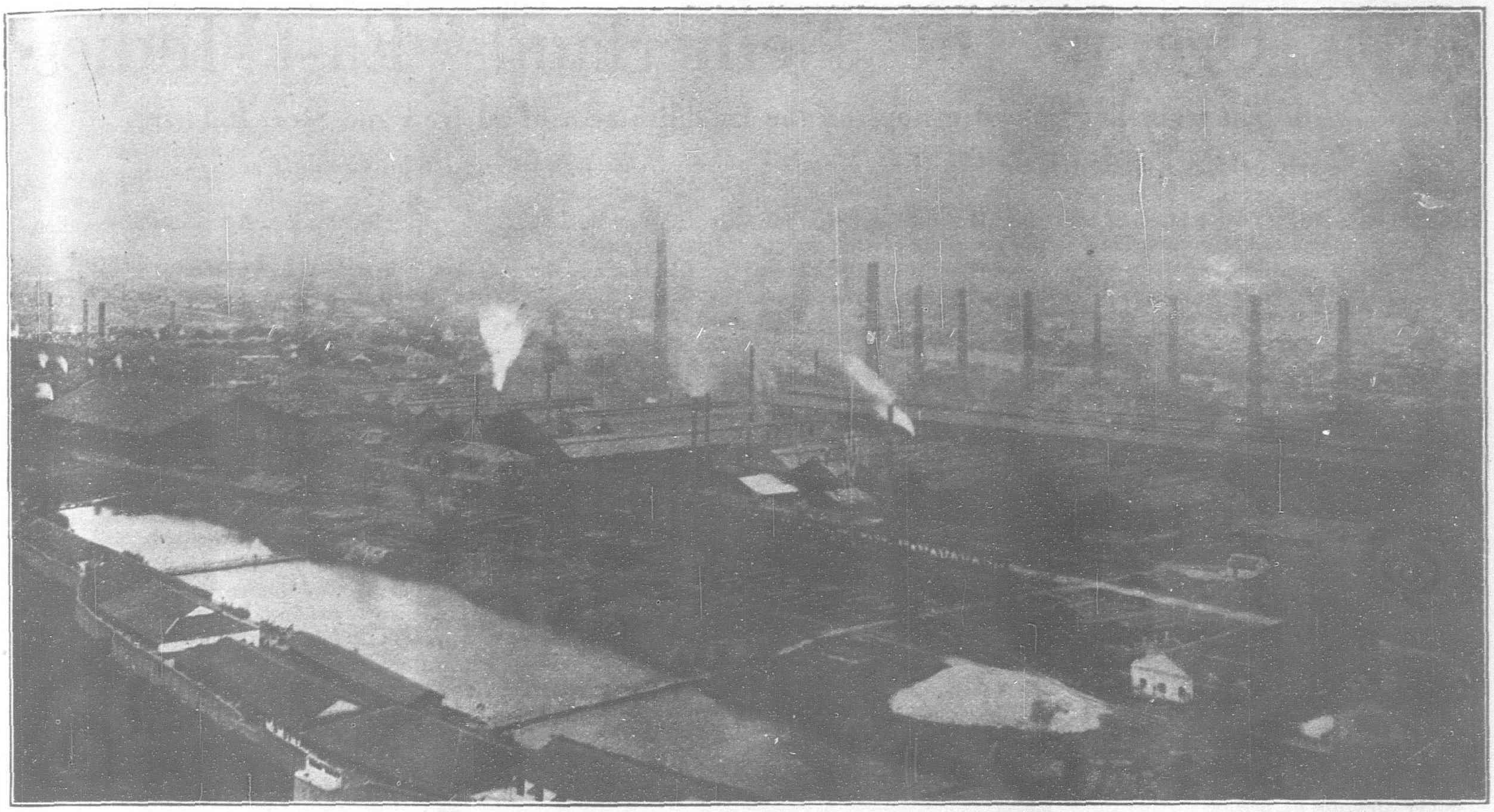
The following table gives at a glance the costs of iron manufacture in China, as compared with that in the United States:—

Raw Materials	Tons	Liu-Ho-Kou Mining Co. (Yangtze Furnace)	Hanyang	Penhsihu	United States
		1923	1920	1921	1923
		Gold $	Gold $	Gold $	Gold
Iron ore	1.61	3.94	3.33	14.83	9.50
Manganese ore ...	0.02	0.14	.33		
Limestone	0.40	0.32	.46		1.25
Coke	1.11	10.76	13.46		10.50
Scrap		—	.18		—
Total		$15.16	$17.76	$14.83	$21.25

---

*Estimated.

†1.00 Gold $2.00 Mex.-Ts. 1-45.



GENERAL VIEW OF HANYANG IRON AND STEEL WORKS

Labor	0.55	0.28	1.26	1.75
Supplies and stores ...	0.30	0.12	—	2.00
Repairs and maintenance	0.28	0.19	1.29	
Replacement of tools .	0.03	0.36	—	
General expenses ...	2.60	.96	3.82	
Financial expenses ...	2.80	3.60		
Power	—	0.62	1.28	—
Total	$21.72	$23.89	$22.48	$25.00

From the above it is apparent that at present China can produce pig iron more cheaply than the United States. On the whole, the cost of raw materials as well as the cost of labor is lower in China, while the purely manufacturing cost is lower in the United States. I am not sure whether the financial expenses are included in the total figure for the United States as given in the above table.

The number of man-hours per ton of pig iron at the Yangtze Blast Furnace is on an average about 17 as against between 1.72 and 6.2 in the United States, although the labor cost per ton of pig is cheaper in China. This points to a moral: cheap labor is always inefficient.

Let us examine the assembling cost of raw materials per ton of pig.

	Yangtze Blast Furnace, 1923 Gold	Valley Furnace (U. S. A.), 1920
Coke	$3.64	$ 2.77
Limestone	0.18	0.42
Ore	1.04	6.47
Supplies	—	0.50
Taxes	—	0.31
Total	$4.86	$10.47

The above figures require no comment.

The present depression of the pig iron market in China is an after echo of the world trade depression, although the panic in Japan two years ago has added its effect upon it. I have reason to believe that under existing conditions, China cannot consume more than 100,000 tons of modern furnace pig iron and so the excess of production has to depend upon the Japanese market, which, in fact, indirectly controls the local Chinese market. The price has grown more and more shaky every day. Since the cutting down of prices by the Han-Yeh-Ping Co. a few months ago, even the price of Tls. 33.00 fails to interest any buyer at Hankow. Buyers are adopting a "watchful waiting" policy. The same condition prevails in Shanghai, where buyers are not eager to place orders at Tls. 36.00.

Owing to financial stringency, the Han-Yeh-Ping Co. has been shipping its stock to Japan even at a loss. At present Japanese buyers are not eager to place any order even at as low as Tls. 29.00, f. o. b. Hankow. This condition of affairs is indeed gloomy. It would appear that the best way for China to get out of this apparently hopeless situation is to have more steel works established, big enough to absorb the pig iron produced, otherwise she will be obliged to rely upon the Japanese market, where Indian pig iron is trying hard to undersell Chinese pig iron. May the man at the helm of this industry have a wide vision of the situation!

Steam Power Reserve Plants Operating in Japan

CONTRARY to all calculations the demand for electric power in Japan has increased to such an extent that there will be no excessive surplus during the first half of 1924. Hydro-electric companies have commenced to operate their reserve steam plants in order to make up the shortage of power caused by the diminished volume of water in the lakes and rivers about the middle of January. Companies operating steam power houses are:

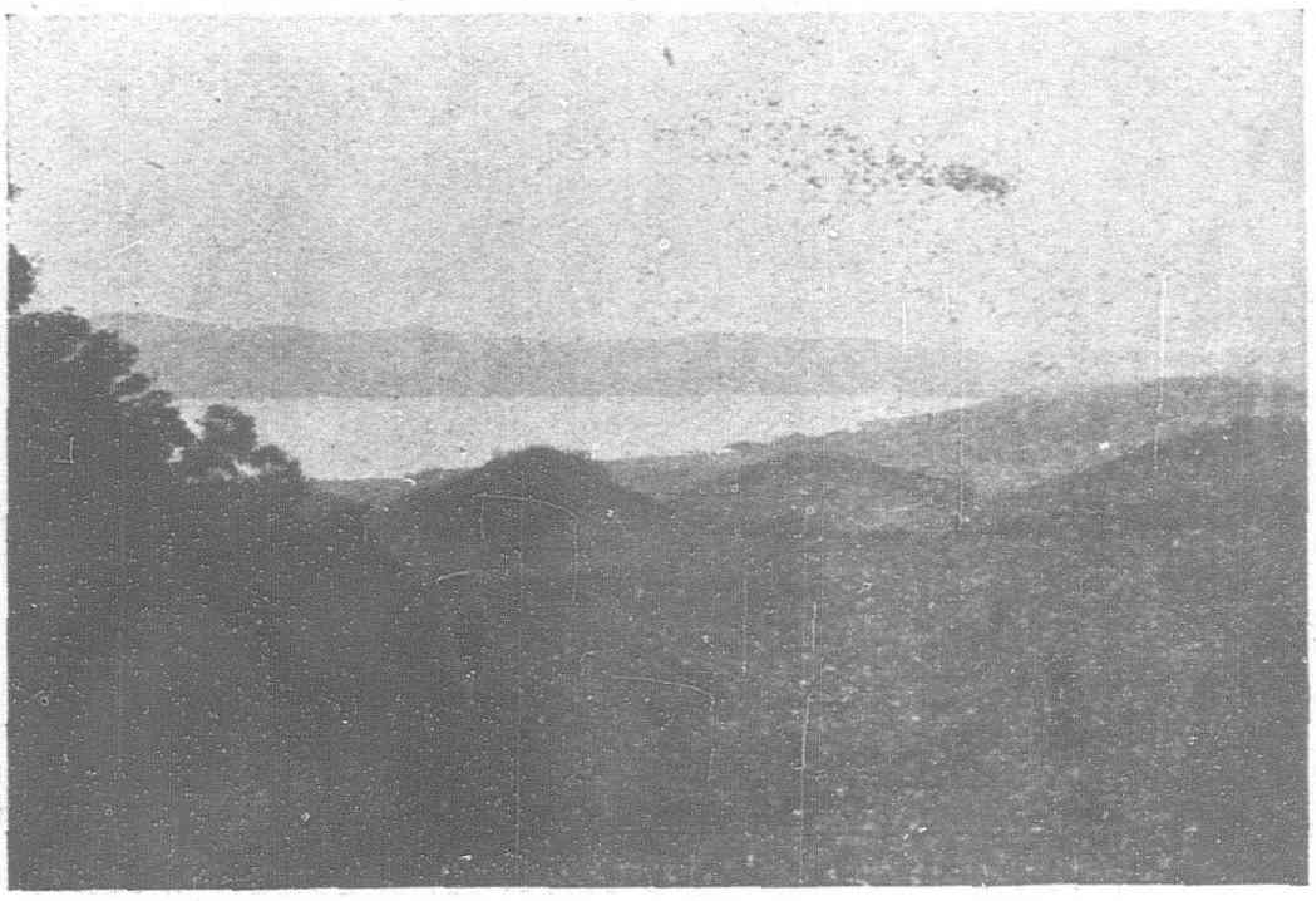
Daido Electric Power Company:
    The Kasugade No. 1 power plant, 15,000 k.w.
    ,, No. 2 power plant, 10,000 k.w.
    Kema power plant .. 10,000 k.w.
Ujigawa Electric Power Company:
    Fukuzaki power plant.. 10,000 k.w. (4 sets)
    Imazu power plant .. 10,000 k.w. (2 sets)
The Osaka Municipality:
    Kujo Power Plant .. 1,500 k.w. (3 sets)
    Ajikawa Power Plant.. 3,000 k.w. (2 sets)

Iron Ore in the Netherlands East Indies

With Some Further Considerations on the Establishment of an Iron and Steel Industry

By J. Van Der Waerden, C.E., Member of the Government Industrial Committee

AMONG the readers of this paper it is probable that few have a comprehensive understanding of the mining possibilities in the Netherlands East Indies, that large archipelago, situated between Australia and the Malay peninsula, with a population of nearly 50,000,000. Except for the well-known oil fields of Borneo, Sumatra and Java, and the Banka and Biliton tin mines, little has been published about mineral deposits in the N. E. I. in a language other than Dutch. Herewith is a brief description of the huge iron-ore fields in Celebes and Borneo, discovered four years or so ago, and of the possibilities of developing an iron and steel industry.



Lake Matano: In the foreground, Limestone Mountains; in the background Mountains with Nickel Deposits

When, at the outbreak of the European war, Neth. Indies dependence upon other countries was strongly felt, the government put the question to the bureau of mines if there is a sufficient supply of iron ore in the Indies to justify the founding of an iron and steel industry. After a close investigation of the fields already known, a sorting out took place, and it was arranged that Java and Sumatra should not be investigated any further. Although along Java's south coast, between Tjilatjap and Banjumas, extensive iron ore sand fields are met with, the quality of the ore is such that an economical exploitation of the same is out of the question. As regards the iron ore deposits of the Lampongs in Sumatra may be mentioned that the ore is of the very good quality, but the supply amounting to about 2 million tons is too small for a large scale iron industry.

So Celebes and Borneo remained for further investigation, as on account of certain geological characteristics it was to be expected that in these islands large amounts of ore were to be found, and from times of the East Indie Company it was known that the people in central Celebes manufactured exceedingly good swords from ore that they obtained in the vicinity of the Matano lake.

These governments' investigations have brought about that in the archipelago the two most important ore deposits are the one in central Celebes and the other in southeast Borneo.

These ores belong largely to the same class as the well-known Cuba ores (Mayari). In relation to their origin these ores are found on the surface and can therefore be obtained by means of so-called open outputs.

In *Celebes* the ore occurs in the vicinity of the lakes, more especially the Larona field; and where the lateritic ore deposit consists of a thin layer of loose ore gravel and lumps. Underneath this there is sometimes a layer of solid ore, followed by fine granular ore and iron clay. The hard and soft ores have materially (chemically) the same composition. In the Larona field, about 8 k.m. long and 1½ k.m. broad, an ore deposit has been indicated and estimated of about 370 million tons iron clay (soft ore) and about 12 million tons lump ore (hard ore).

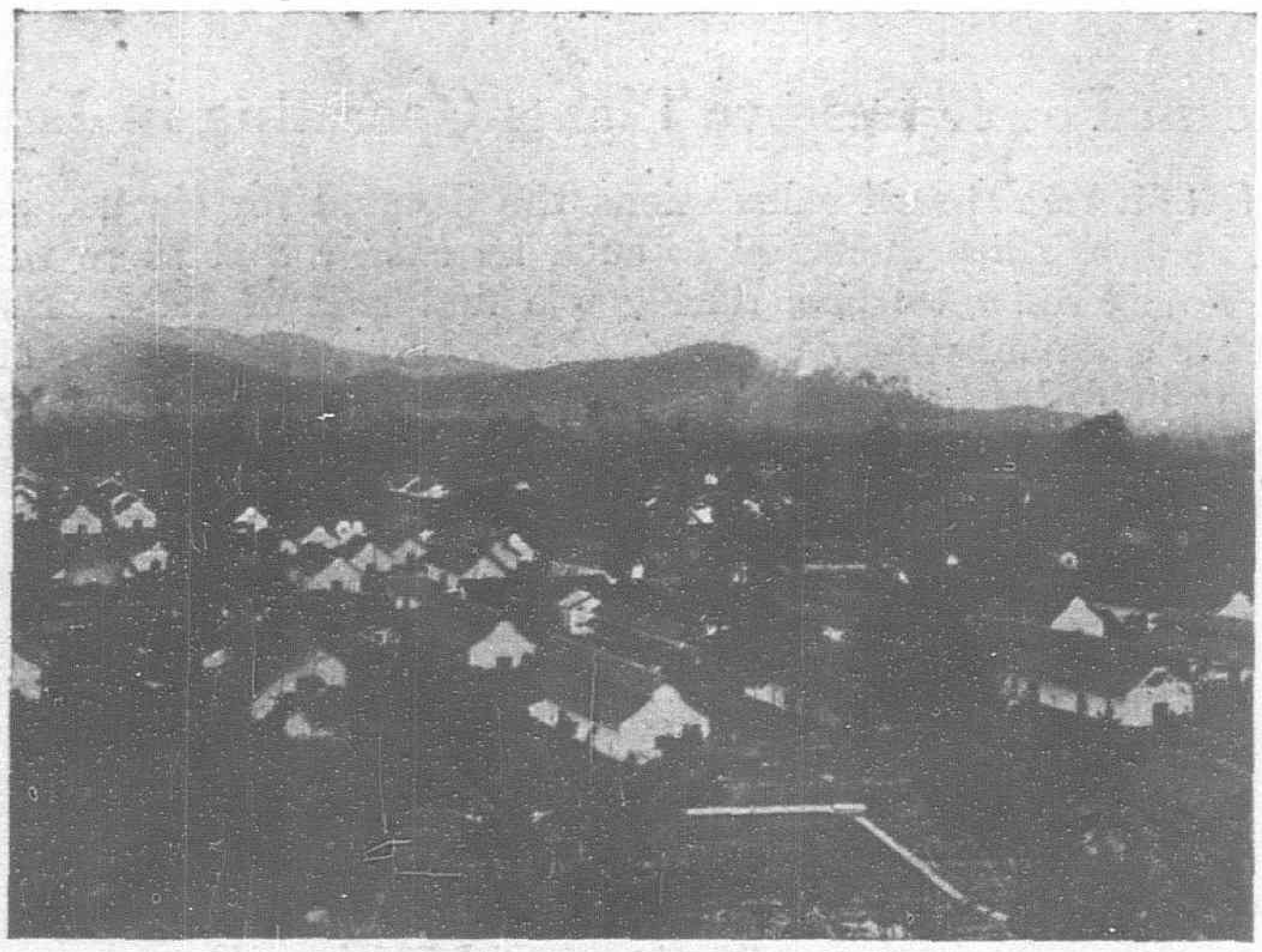
The physical properties of the iron clay make it unsuitable for transport (export) unless "sintering" (nodulising) is first done. The cost of this for Celebes is estimated at 2 to 2.50 guilders per ton (Cuba: 0.80 to 1 dollar). An advantage of this process, however, is that it drives out volatile parts, thus decreasing the cost of transport in relation to iron percentage and quantity. For smelting on the spot, this physical objection to the soft ore is of minor importance.

The analysis of average samples of easy accessible iron ores at the Larona field gives:

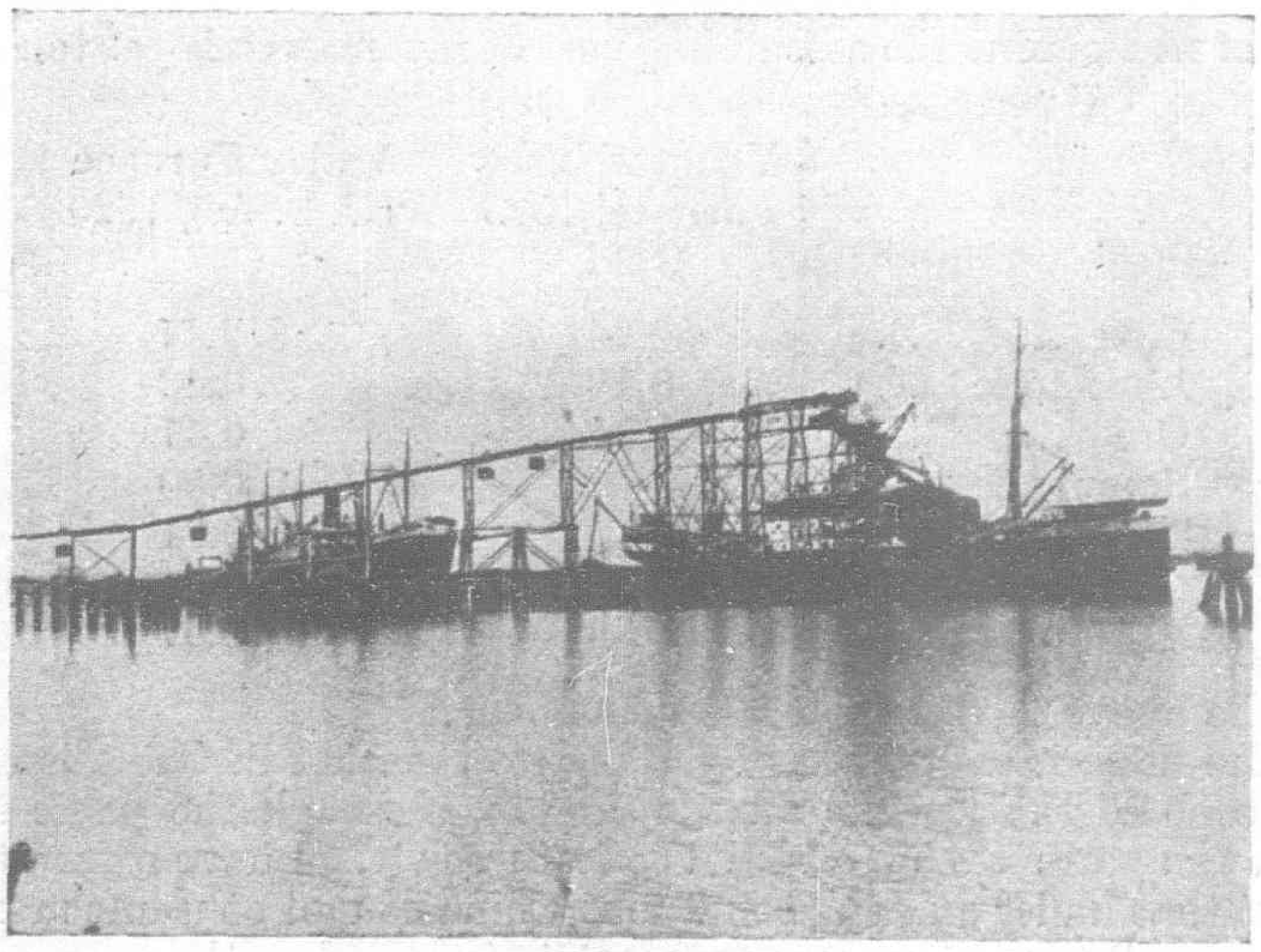
Si02 = 2.02 %
Al203 = 5.00 %
Mn0 = 1.03 % = 0.80 % Mn.
Fe03 = 68.30 % =47.80 % Fe) 49.09 % Fe
Fe0 = 1.66 % = 1.29 % Fe)
Ca0 = 0.73 %
Mg0 = 0.07 %
P205 = 0.094 % = 0.041 % P.
S = 0.096 %
Loss on ignition = 18.15 %
Cr203 = 2.46 % = 1.69 % Cr.
Ni0 = 0.39 % = 0.30 % Ni.

100.000 %

In *Borneo* the iron ore deposits are found in the southwest slope of Mt. Koesambi-or Koekoesan, also named the Soengei Doewa



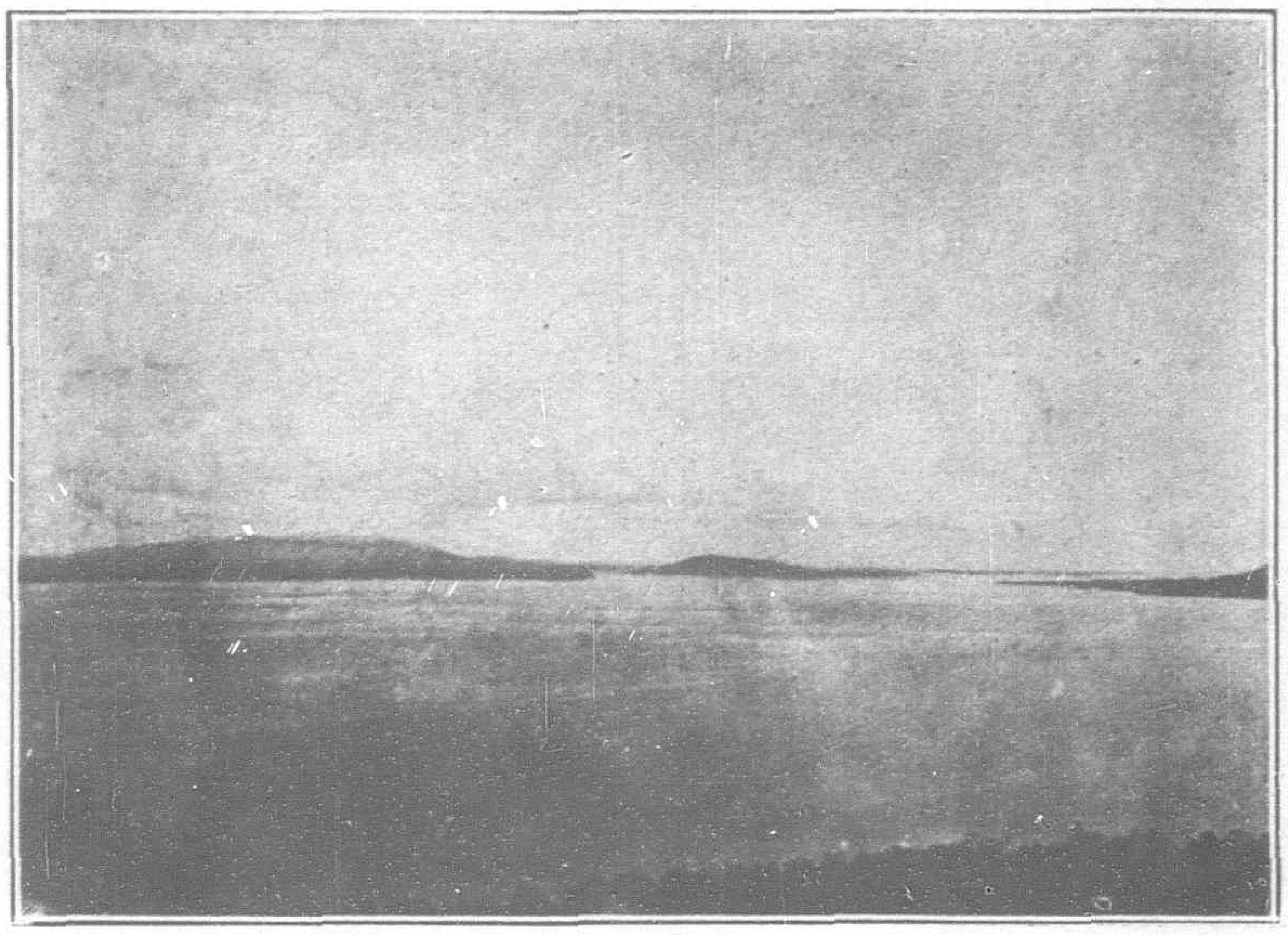
The Coal Centre Pulu Laut, is the Isle of Laut on the S. E. Coast of Borneo



Loading Coal at the Wharf of the Pulu Laut Mine

field. The question as to whether these are of other than lateritic origin has not been solved. The deposits found are between altitudes of 50 to 100 metres above sea level, principally in the form of solid bank, covering an area of several square kilometres. Higher up, on the crowns and the less steep slopes of the mountain ridges, this bank breaks up into a few ruptures of great content, and, in addition thereto, smaller more rounded off blocks and a sort of granular ore gravel are found up to a height of about 300 metres, the whole being outlined by a border clearly perceptible.

The ore mass is brown (in contrast with the blacker Larona (Celebes) lump ore), amorphous and dense; the structures found seem to indicate "metasomatic" ore deposits. The stock of ore of that part of the Mount Koekoesan not covered with sedimental layers is estimated at 100 million tons of hard ore, lying on the surface, with an average of 48 per cent. of iron; the area of this bed is approximately 17 square kilometres.



Southern Entrance of the Laut Straits. View from Mt. Semiaran. In the centre is Soewangi Island; at the left Mt. Koekoesan

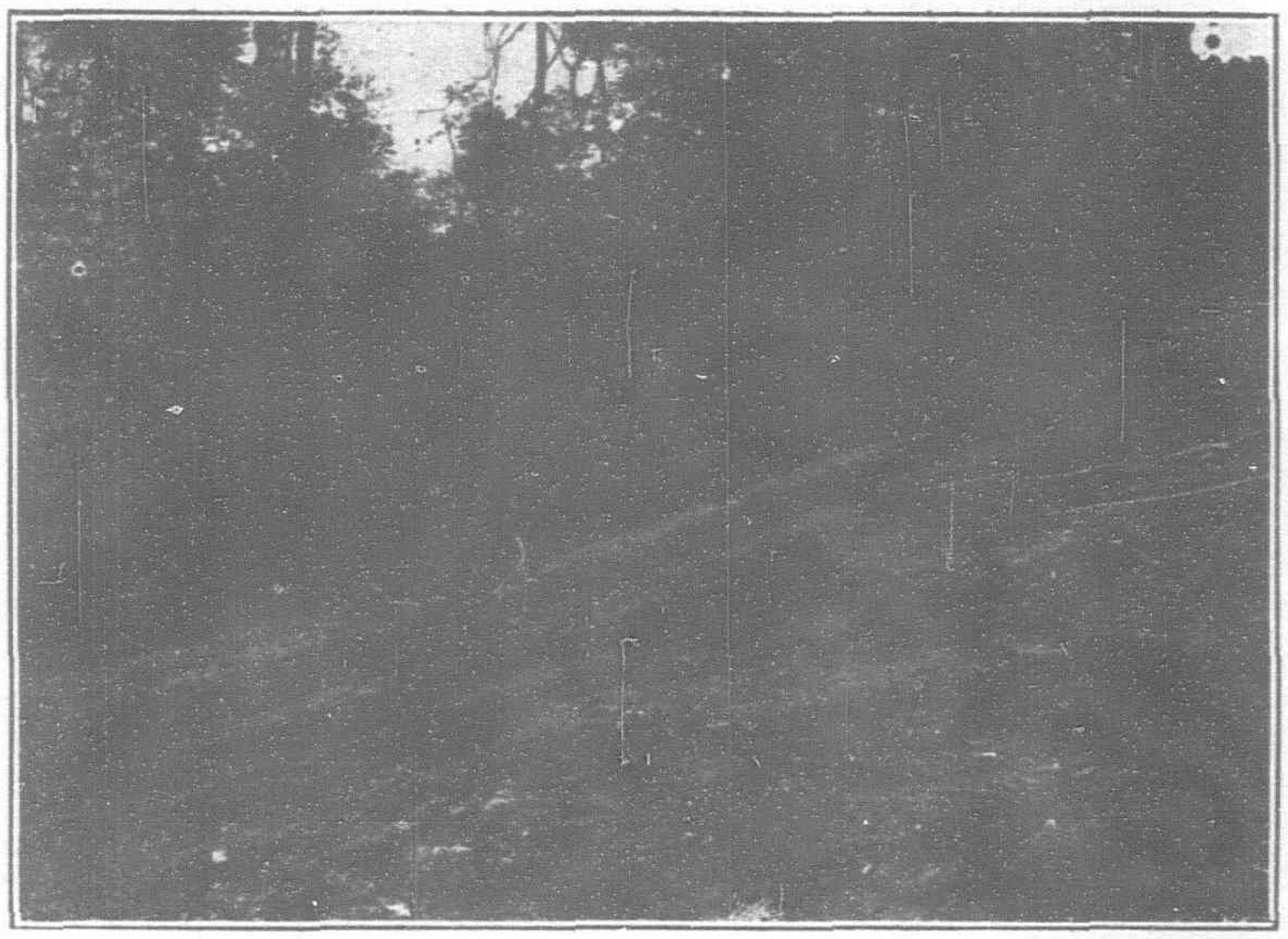
Under the tertiary sediment is found a green, less rich ore, the value of which as well as the quantity it is impossible to estimate and may therefore better be left out of consideration.

The bank ore of Soengei Doewa shows the following chemical analysis :—

SiO_2 ..	4.53 %	
Al_2O_3 ..	10.50 %	
Mn_3O_4	1.20 %	0.86 % Mn.
F_2O_3 ..	69.00 %	48.3 % Fe.
MgO ..	0.27 %	
P_2O_5 ..	traces	
S ..	0.16 %	
Loss on ignition	12.09 %	
Cr_2O_3 ..	1.40 %	0.95 % Cr.
NiO ..	0.85 %	0.66 % Ni.
	100.00 %	

Transport Conditions

The deposits in *southeast Borneo* are more favorably situated for exploitation than the lateritic ores of *south Celebes*.



The ore deposits on the slopes of Mt. Koekoesan may easily be connected up with the coast (Straits of Laoet) by a railway line. This line of 15 kilometres would have its terminus in the mountain at an altitude not exceeding 50 metres above sea level, where a continuous layer of hard ore is reached with an average thickness of 6 metres in a comparatively small area of 2⅜ square kilometres, containing a stock of ore of about 40 million tons.

In *Celebes* the conditions are that the principal ore deposits lie around the higher lakes, the shortest distance (by aerial line) from the coast (Gulf of Boni) being 28 kilometres, the distance measured along the river (Larona-Malili-Lampea) 50 kilometres.

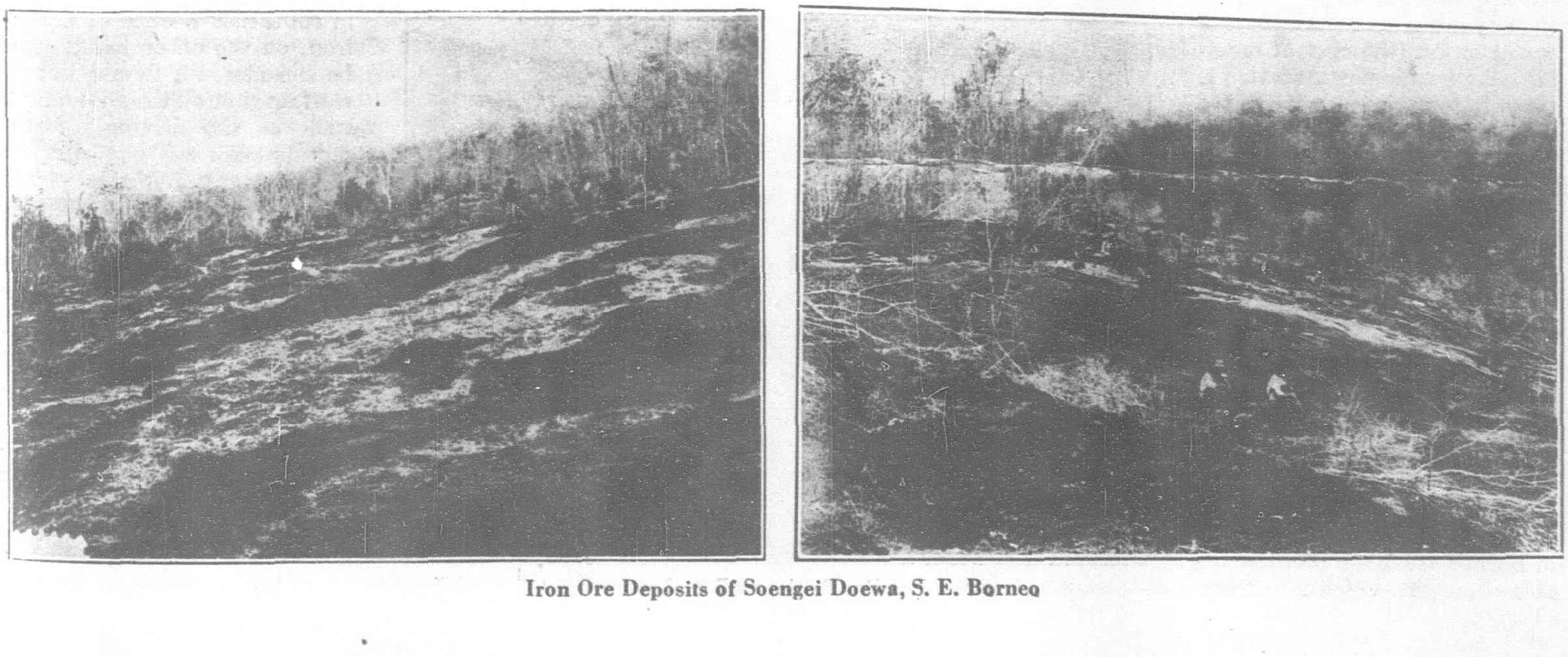
The natural entrance (be it out of the way) to these ore deposits is formed by the cleft of the Larona, which is the outlet of the lakes. As a port of shipment, Oesoe bay offers itself, more especially the "Iron Bay" south of Lampea. It appears possible to develop a railway route from the Larona field to Iron bay. It also appeared possible to trace a cable transport system (aerial ropeway) which, from the Larona ore field to the coast, would have a length of about 32 kilometres, crossing an intervening saddle of 460 metres high.

Whereas in *Borneo* the means of transport (a railway is cheaper here than an aerial railway of large capacity) for the iron ores require a capital outlay of about 700,000 guilders, the 38 kilometres long railway (25 pro mille) for *Celebes* is estimated to require not less than 6,000,000 guilders.

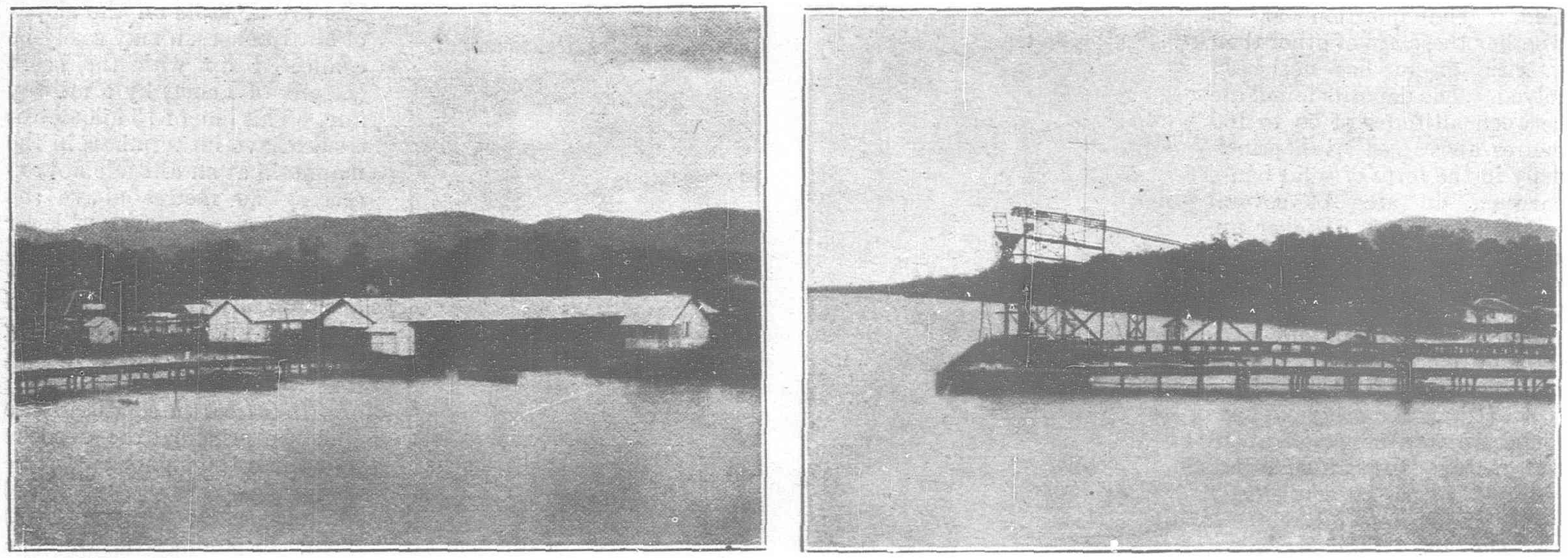
Utilization

The iron ore deposits lend themselves in the first place for ore mining, principally working for exportation.

The utilization to their full extent, however, requires the foundation of domestic smelting works (reduction furnaces or



Iron Ore Deposits of Soengei Doewa, S. E. Borneo



Coaling Station at Pulu Laut

electro-thermic smelting) and finally of steel plant (rolling mills, etc.)

For an export business southeast Borneo is preferable.

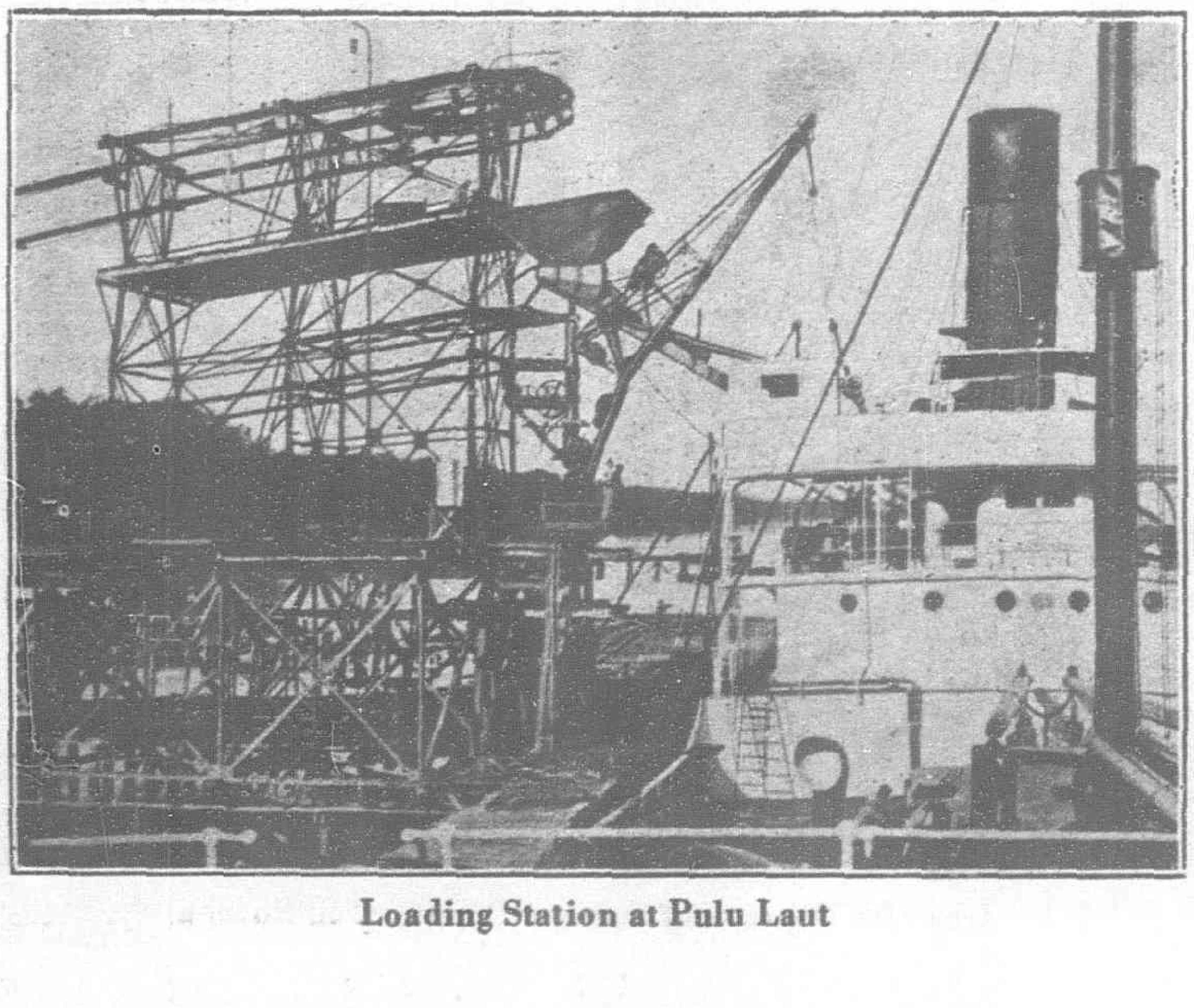
As far as the value of the ores for metalurgical manufacture is concerned, no difference need be made between Borneo and Celebes ores, even though the analyses (chemical composition) and also the mineralogical structures differ slightly.

Under the conditions prevailing in *Celebes*, an ordinary blast furnace plant (coke blast furnaces) is practically excluded; and owing to the enormous hydraulic power present in the Rona river and on the other hand, the lack of coal and coke in the neighborhood, need not to be considered.

The expert reports advise electro-thermal treatment here, that is to say, a complete electro-metallurgical plant with electric shaft furnaces of the charcoal type.

Similar calculations have been made for *Borneo*, but instead of taking charcoal as the reducing material, it was possible, in view of the coal deposits at Poeloe Laut, and those in the vicinity of the iron-ore field, to reckon on an adequate, if less hard and therefore not rich, supply of coke. (The coke used in an electric furnace may be of much lower quality than that for use in the ordinary blast furnace).

In view of this, electric furnaces were designed of the coke type, i.e., with very low shafts. Owing to the very favorable conditions with respect to the coal deposits of Soengei Doewa (below and in the neighborhood of the iron-ore field, electricity can be generated on the spot in a steam-power station at a cost of one cent, Dutch currency, per kilowatt hour, thus not dearer than that of a water-power station in Celebes. Consequently, the advantage that Celebes seemed to have above Borneo up to the present, owing to its natural hydraulic power, disappears. While Borneo with a steam-power station would have the advantage as regards cost of construction (the cost of erecting a hydraulic power station is three to four times higher).



Loading Station at Pulu Laut

The cost of producing pig iron in an electric shaft furnace plant in Borneo, is lower than in Celebes.

Although, as against prices of 35 to 42 guilders per ton pig iron, which must be taken as the prices for America and Europe, a competitive electric smelting industry cannot be founded in Borneo even after allowance has been made for the advantages in freight and local markets (averaging 6 guilders per ton), the chances of success in founding such works in Borneo are much more favorable than in Celebes. Prime cost plus advantage in freight approximate very closely to the prices obtained in Europe and America.

A blast furnace undertaking in S.E. Borneo, however, would be in a stronger position if a good metallurgical coke were available on the spot for the reduction of the iron ore in the standard type of coke blast furnace.

Calculations based on complete schemes have demonstrated that in this case good results might be expected.

A coke blast furnace plant in S.E. Borneo would under the conditions summarised, supply a product at a price equivalent to that of the world market, i.e., the production cost in Europe and America.

Meanwhile, the composition of the pig iron obtained from the Borneo ores (unserviceableness as cast iron) as well as the scanty possibility of further manufacture in establishments in East Asia, combined with the favorable freight conditions in exporting outside east Asia, indicate that the manufacture of the raw and half-finished products can be better entrusted to blast furnace plants in the Netherlands East Indies themselves; or in other words, operations cannot cease at the production of pig iron, since only further refining can guarantee the certainty of a market abroad and at home. For rails, profile iron and plates, etc., a good market may be expected in the Netherlands East Indies and vicinity; on the other hand, for a not common pig iron there is little or no market.

The last phase for a domestic iron industry, the local rolling of the product into rails, profile iron, bar iron, plates, etc., will therefore have to be considered.

The situation of works in southeast Borneo for supplying the archipelago and for shipping products abroad, is much more favorable than in central Celebes or on the Gulf of Boni. The cost of constructing rolling mills is the same in both islands. The further manufacture in *Java* instead of in southeast Borneo of the pig iron, on the other hand, could be considered if it were not for the fact that all the advantages, such as the driving of the motors with the gas from the blast furnace and coke plants, as well as the advantage of a local steam electrical power station near the Soengei Doewa field (with the coal from there) would then be abandoned.

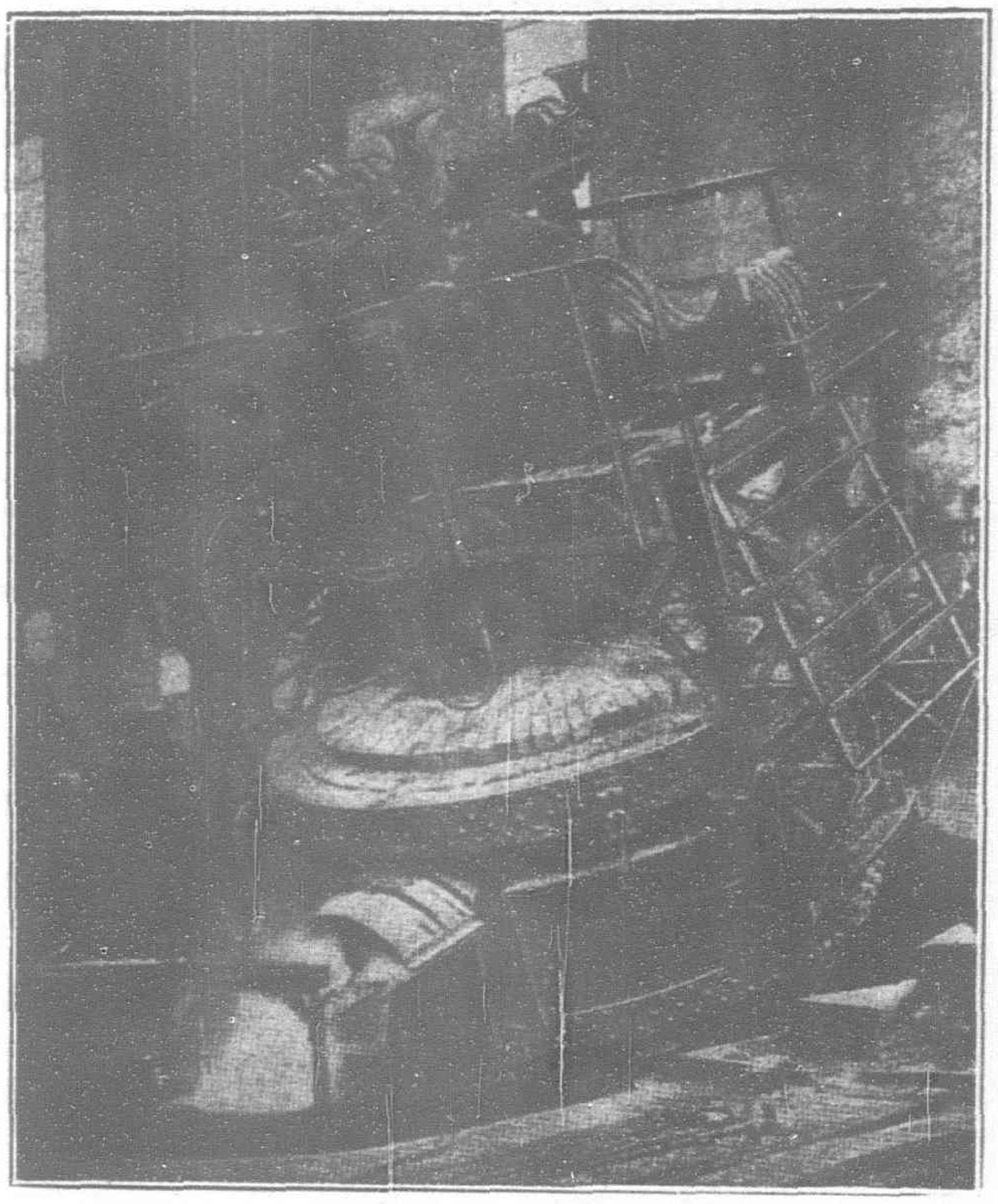
Carefully worked out schemes for a complete blast furnace and steel plant and rolling mills, and calculations based thereon, have demonstrated that it must be possible to manufacture rails, profile iron and bar and plate iron at a competitive price. With a

(Continued on page 129)

Electrical Furnaces for Shanghai

THE article on "Shanghai as a Field for Electric Furnaces" by Mr. Lansing W. Hoyt, the American trade commissioner, which appeared in the June (1923) number of THE FAR EASTERN REVIEW, has attracted considerable attention in the British and American iron and steel technical press which recognizes the peculiarly favorable situation of this port for the development of such an industry by reason of the cheap supply of electricity coupled with an over supply of cheap labor. There is little doubt that the time is not far distant when the initial steps will be taken to realize a dream made possible solely by the splendid municipal electrical plant which has developed into one of the foremost of the world in point of efficiency of service combined with exceptionally low costs to the consumer.

Various types of electric furnaces are being perfected by manufacturers in American and Europe to meet the ever increasing demands of the high-grade steel industry. *Engineering Progress* says that the total number of electric furnaces of all countries rose from 140 in 1913 to 1,025 in 1920. America and Canada stand for 363 furnaces, England for 160, of which 70 are erected in Sheffield, whilst Germany possesses about 1,000 furnaces. Over 90 per cent. of these furnaces are arc furnaces, the majority of which are of the Héroult type. This type has found favor owing to the minimum capital expenditure and costs for repairs, and great reliability in service. Statistics not only show an enormous increase of electric furnaces during the war, but also an extraordinary increase during the years 1919 to 1920, in spite of the fact that the furnaces, which had been used for war material, had been turned to better account.



Electric Furnace in Service

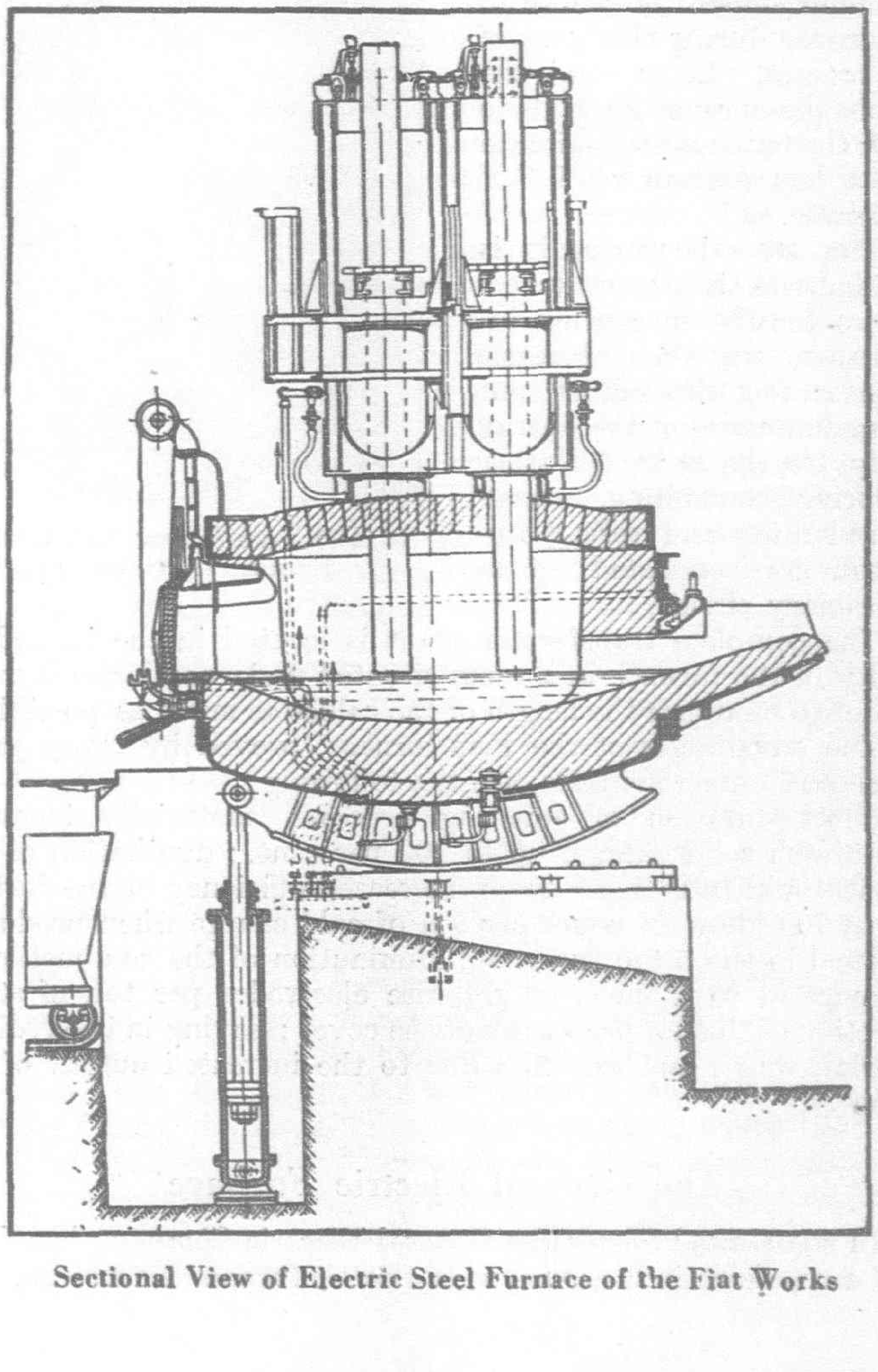
The dearth of iron and coal during the war caused the Fiat Works of Turin to design an electric furnace by means of which it was possible to economically produce the ordinary kinds of steel in large quantities. For some years past the iron foundry of the Fiat Works has employed six furnaces of 5 to 7 tons capacity each; the results obtained with these furnaces were so favorable that Fiat rejected the open-hearth (Martin) furnaces they had originally planned for their forge at Turin and erected a new Steel Works, equipped with fourlarge electric steel furnaces of 15 to 20 tons capacity each and two smaller furnaces of 6 and 3 tons capacity built by the Demag of Duisburg in co-operation with the A. E. G. These electro-steel works will be enlarged by the addition of four to eight furnaces, after removing the old steel works. The increased capacity, the novel method of sealing the electrodes, and the advantages of these Fiat furnaces are worthy of mention and we shall, therefore, give a short description of their design.

Fig. 1 illustrates a 5-ton furnace in service. Tilting in both directions is achieved by means of rockers. Some of the Fiat furnaces are tilted hydraulically, but the furnaces recently erected, are tilted electrically so as to avoid the provision of a special hydraulic plant.

The Arrangement and Sealing of the Electrodes

The arrangement of the electrodes of this three-phase furnace is of special interest. The three vertical graphite electrodes have a diameter of 250 millimetres and with their complete fittings rest on a bridge. Each electrode with its fittings, regulating mechanism and motor is detachable and may be exchanged whilst in service in about half-an-hour, should this be necessary. The bridge carrying the three electrodes is also easily removed.

On removing the bridge, the cover ring with the brick lining can be taken off, so that the fire-brick lining of the cover or the furnace can be renewed without difficulty. The repairs, which are frequently necessary with other furnaces, especially for the thinly lined bow over the door, are avoided in this furnace, because a water-cooled chamber connected with the frame of the door is provided instead of the bow, which enables one furnace being operated 150 times without interruption. The excellent results of this furnace are due especially to the careful and novel method of sealing the electrodes and the cooling of same. (See Fig. 2.) A jacketed cylinder is fixed to the cover, and is cooled with water; this cylinder contains the electrodes. A second cylinder is fixed to the terminal of the electrode, which latter is automatically moved by two motor-driven spindles. This second cylinder moves telescopically and perfectly air-tight over the cooling cylinder simultaneously with the electrode. The sealing is so perfect that it is possible to stand on the bridge when the furnace is in service, whilst with other types of furnaces the violent action of the flames round about the electrodes makes this impossible. The lack of these very unpleasant flames proves, that in the Fiat furnace no cold air enters through the door, or hot air, or gas, escapes at the



Sectional View of Electric Steel Furnace of the Fiat Works electrodes, and thus no loss of heat or current is possible, as is the case with other systems. A great saving in electrodes and current is also due to the non-combustion of the electrodes at their exit from the furnace.

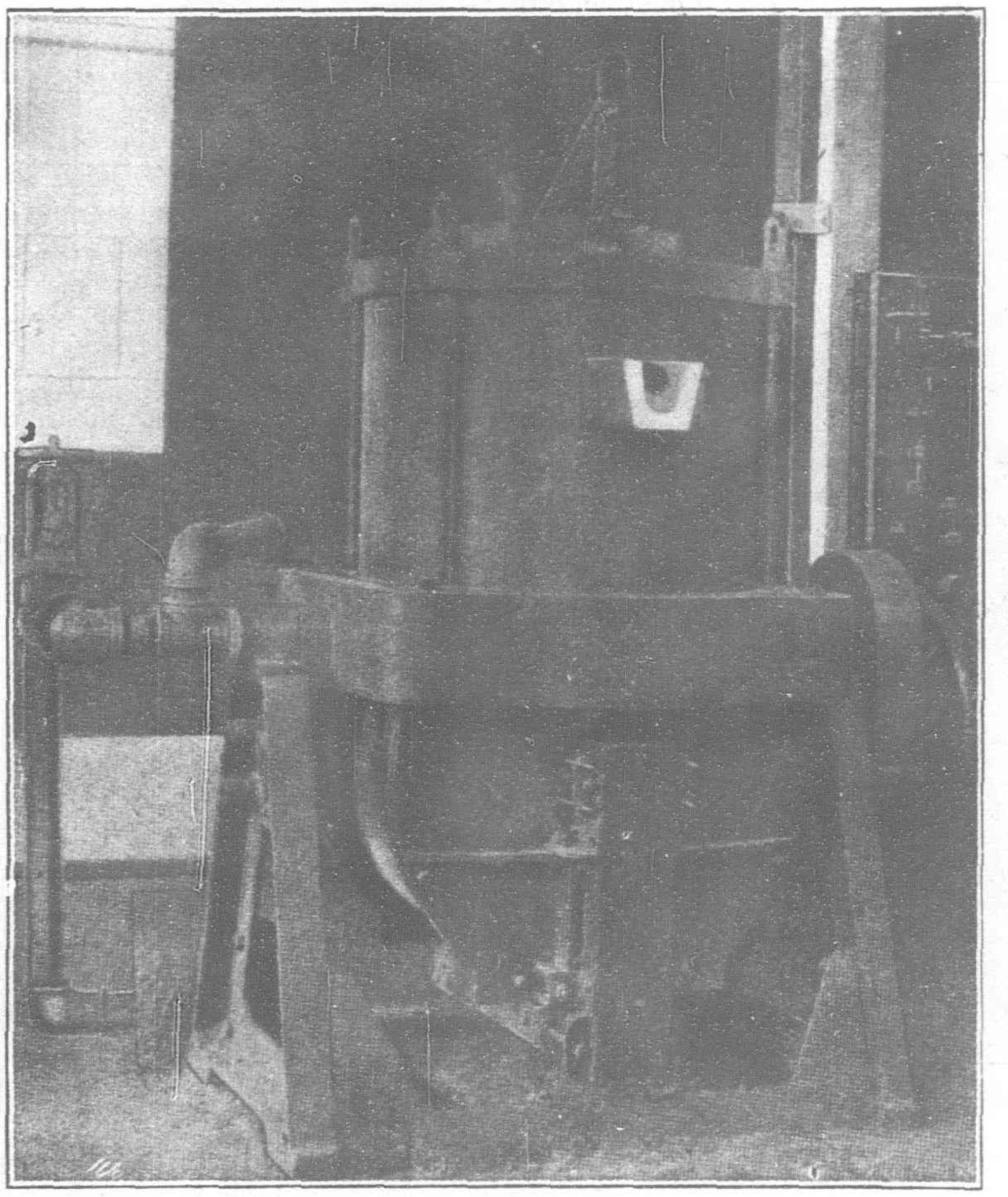
The Furnace Transformers

The special three-phase transformers used for the Fiat furnaces have an output of 6,000 kva for each 15-ton furnace, of 1,800 kva for the 6-ton furnace and of 1,000 kva for the 3-ton furnace. The 6,000 kva transformers are of the shell type, the 1,800 and 1,000 kva transformers of the core type. All transformers are oil-cooled, *i.e.*, the oil is circulated by a pump from the transformer oil tanks through a cooling device and back to the transformers. A very efficient circulation of the oil in the transformers is thus set up which ensures perfect cooling of the windings and iron cores.

The primary winding is designed for 22,000 to 21,500 volts, and has terminals outside of the oil vessel to permit altering the connections from delta to star. The secondary winding is star-connected. The neutral point of the transformer is metallically connected with the bottom of the furnace, and is also earthed to limit the pressure between the electrode terminal and the metallic parts to 75 volts.

The secondary winding produces 130 volts pressure when the primary is delta-connected, and 75 volts when the primary is star-connected. Both pressures are line voltages. The furnace is operated with these two pressures; the 130-volt pressure is employed to smelt the solid contents of the furnace and to supply a maximum amount of energy to the furnace during this part of the process. Later on, the 75-volt pressure is applied to purify the bath and to maintain it at a temperature of 1,750° Centigrade.

The secondary circuit is provided with the current transformers for the measuring instruments, and the automatic regulator for the adjustment and maintenance of the energy supply for the arc. All other measuring, controlling, recording, switching and safety apparatus are connected up in the primary circuit.



The Transformer Construction of the G. E. Repulsion Induction Furnace is evident from the Laminated Core in Lower Section

The complete transformer plant is located in the immediate vicinity of the furnace in a room situated underneath the furnace, in order to minimize the length of the cables as much as possible.

The advantages of the Fiat furnace, proved by many years' service and numerous tests, are the following:

Short duration of smelting process; materially increased output with solid charge, up to 100 per cent.; diminution of the electrical and radiating losses; increased efficiency of the furnace (630 to 700 kilowatt hours per ton of cold charge when producing cast steel in the 5-ton furnace); diminution of the combustion of electrodes, 3 to 5 kilos. of graphite electrodes per ton of steel; protection of the fire-brickwork of the cover; saving in deoxydizing material, wages and expenses due to the increased output of the furnace.

The General Electric Furnace

In the United States the General Electric Company has developed a repulsion induction type of electric furnace for melting non-ferrous metals which is specially adapted for the smaller foundries and machine shops scattered throughout the settlement. Fundamentally, the furnace is a transformer in which the secondary winding is a single turn of metal which becomes so hot from the current passing through it that it melts. Being enclosed within a narrow channel it retains its original circular shape about the transformer core and primary, so that it continues to carry current in its molten condition. This melted metal comes in contact with the metal (in scrap or ingot form) with which the furnace is charged, and the latter begins to melt from the heat imparted and to flow into the secondary duct, replacing the original "winding." This flow of molten metal is produced by a very simple method, based on certain transformer characteristics.

Transformer engineers have been at times unpleasantly impressed by the tendency of transformer windings to assume such antipathy for each other as to cause violent efforts on the part of each to leave the other's company rather than living quietly side by side. This antagonism is compensated for in an ordinary transformer but is deliberately encouraged in the furnace and is the reason for the word "repulsion" in its name.

By simply locating the primary coil in a position to develop the mutual antipathy, the flowing metal in molten state takes on an animated motion which as the metal in the furnace body melts, extends through the whole mass and keeps it in a state of agitation. This action is what is needed in a furnace as it insures a thorough heating and a thorough mixing.

The illustration and the following description will give to those interested in the subject, technical information on this contribution to foundry practice.

The repulsion induction furnace has been developed to meet the demand for a highly efficient electric furnace for melting copper and all brasses and bronzes.

Wherever this furnace is applicable, it provides the most economical means of melting, on account of its high thermal efficiency, rapid melting rate, continuous automatic stirring, and low metal loss.

A new and important feature of the furnace is the "pre-formed" lining. Three refractory forms comprise the main lining. These forms are cemented together to form the main holding crucible at the top of the furnace and the heating chamber in the lower section. Suitable heat insulating material is placed between the formed lining and the steel shell. A lining can easily be completely removed, and a new one inserted and made ready for operation in three days. The standard lining will operate successfully up to a temperature of 2,500 deg. F. (1,370 C). The life is long and replacements relatively inexpensive.

The furnace has a holding capacity of 1,200 pounds of molten brass and a pouring capacity of 750 pounds. The balance of 450 pounds must be kept in the furnace in a molten condition at all times unless a source of liquid metal is available for priming. The radiation loss is so small that only a small amount of current is necessary to maintain this bath molten during periods when the furnace is not in production. Furthermore, the furnace needs practically no attention during these intervals. Periodical inspections are all that is necessary.

The furnace is rated 75 kw. single phase at approximately 75 per cent. power-factor. It may be built for operation from any standard 220-, 440-, 550-volt alternating-current circuit. For voltages higher than these a step-down transformer can be used. The load is very steady and is practically free from fluctuations.

Operating continuously at full capacity the furnace will easily melt 750 pounds of clean, yellow brass (60 per cent. copper, 40 per cent. zinc), ingot or scrap per hour. Under these conditions the power consumption will not exceed 200 kw-hr. per ton of metal melted and the metal loss will not exceed 1 per cent.

The electrical equipment is very simple and consists of an auto-transformer and control panel. The auto-transformer is arranged for mounting on the back of the panel and is provided with taps for various voltages so that the power input and consequently the temperature in the furnace and the melting rate are controllable. On the front of the panel are mounted the necessary instruments together with an air circuit breaker and a tap selector switch for obtaining the desired voltage at the furnace terminals. The whole equipment is compact and requires very little floor space.

The core and coil constitute the means by which the electric energy is introduced into the furnace, and transformed into heat. The core is constructed of non-ageing transformer steel laminations, assembled in two sections which are fitted with butt joints and bolted together. In designing the coil particular attention has been paid to securing an electrical insulation that will withstand high temperatures, and it has withstood temperatures of 1,100 deg. F. (593 C.) for hours without damage.

For cooling the coil approximately 500 cubic feet of air per minute at 3 oz. to 6 oz. pressure is required. If such an air supply is not available, a small motor-driven blower set can be furnished.

Iron Ore in the N.E.I.

(Continued from page 126.)

normal rate of freight of 11 to 12 guilders to east Asia (the rates of freight prior to 1914 showed this steady tendency for years), the competitive price which may be calculated for the Netherlands East Indies, would be 70 guilders 12 guilders is 82 guilders per ton of steel at the outside, on pre-war conditions.

But it seems impossible, that, seeing the enormous disturbance of the world equilibrium, such a low price will come during the first decennia, so that for an Indian blast furnace plant easier can be expected a minimum selling price of 90 florins per ton, than a lower one.

Steel-works (blast furnaces, steel plant and rolling mills) established in *southeast Borneo*, under the given conditions would, with an annual output of 150,000 tons, be able to supply at such a price and, therefore, offers a safe base for primary and further development.

These results were confirmed by comparative study in Europe and America, and at the same time contract has been obtained with financial groups in Europe and at last with a syndicate in Holland to come to the establishment of an indigenous iron and steel plant.

So in the month of November past the Indies parliament (Volksraad) has confirmed an agreement to be closed between the government of Netherlands East Indies and a Netherlands syndicate on a co-operative base; already in 1925 near the Straits of Laut the construction of the *first* blast furnace in Netherlands India will be started.

New Chinese Financial Commission

Frederic E. Lee, Specialist in Far Eastern Finance, Finance Investment Division

Three times during the past 18 months China has appointed commissions whose principal function was that of bringing order out of chaos in the nation's finances. In July, 1922, Tung Kang, then minister of finance, appointed a national financial commission with Dr. Wellington Koo as its chairman, which was (1) to devise ways and means of meeting the outstanding obligations of the government; (2) to abolish likin and bring about the increase in customs revenues provided for by the Washington conference; (3) to minimize military expenditures; and (4) to work out a system whereby the individuals who keep account of the revenues of the government would be separate from those who actually handle the money. Before this commission had gotten under way the chairman, Doctor Koo, was made Minister of Foreign Affairs and Tung Kang surrendered the portfolio of finance minister.

Again on September 8, 1922, a presidential mandate was promulgated, calling for a national financial conference to meet in Peking to discuss ways and means for the rehabilitation of China's finances. The so-called national financial conference was not supposed to supersede the national financial commission, but was to approach the problem of China's financial status from a different angle.

Both commissions apparently resolved themselves into a national commission for the study of financial problems, under the leadership of Chang Ying-hua, who had been finance minister for a few days following Tunk Kang's régime. Under this commission the plans for the financial reconstruction of China proposed by G. Padoux, adviser to the Chinese government, and of Chang Ying-hua, were produced. These plans gave rise to a great deal of discussion but they contained little that was tangible or constructive.

Financial Readjustment Commision Regarded Favorably

The most hopeful sign in connection with the attempts of the government to restore financial stability is seen in the recent appointment of Dr. W. W. Yen, as chairman of a financial readjustment commission. This new financial readjustment commission, under the leadership of Doctor Yen, former premier and minister of foreign affairs, began work on September 29, 1923, in the president's palace.

According to the Chinese government bureau of economic information, this commission is composed of 15 members, 30 technical experts, 8 secretaries, 20 assistants, and a number of honorary members and advisers. The 15 members are: The ministers of foreign affairs, finance, and communications; the chairman and vice chairman of the board of audit; the director general and inspector general of the maritime customs, the director general of the wine and tobacco bureau; the chairman of the special customs tariff conference preparation bureau; the director general and the associate inspector general of the central salt administration; the ex-chairman of the commission for the study of financial problems; the ex-director general of the financial reorganization bureau; the ex-chairman of the commission for the preparation of a national financial conference, and the governor of the Bank of China, representing the Peking Bankers' Association.

The aims of the commission are (1) to ascertain and verify the actual amounts of the principal and interest of that portion of China's domestic and foreign loans that is not adequately guaranteed; (2) to study the methods of readjustment and redemption of these loans; and (3) to formulate a financial policy for the government after the readjustment, so that its revenues and expenditure will balance. The last item includes also a proper way of separating central and provincial government finance.

The most significant feature of the above aims is that of actually formulating for China a fiscal policy, undoubtedly one of its paramount needs. In the readjustment of China's loans probably a great deal of scaling down will be necessary, particularly, as pointed out by Chang Ying-hua, in such loans as those which bear 74 per cent. interest per annum. It is quite likely that the present financial readjustment commission may have something concrete and definite to offer in the near future in connection with the adjustment of China's indebtedness.

A Sulzer-Oerlikon Plant in China

EXTENSIVE additions to the public service equipment of the French concession are now under construction, including considerable additions to the waterworks and the electric power plant. A four years' program involving an addition of 12,000,000 francs to the capital of the Compagnie Francaise de Tramways et d'Eclairage Electrique de Shanghai is now half finished, and the company is planning large additions to plant during 1924 and 1925.

A new central electric station, constructed in 1921 and 1922, is now in process of further enlargement. In it two 2500 h.p., 2-cycle Sulzer Diesel engines coupled to Oerlikon flywheel alternators with a combined power of 2,500 kva. have been installed, and another much larger motor, with a capacity of 3,300 kva. will be installed this year, while a second of similar capacity will be installed in 1925, making a total of 10,000 kva, greatly superior to the present maximum consumption of the French concession, which is now 3,500 kva.

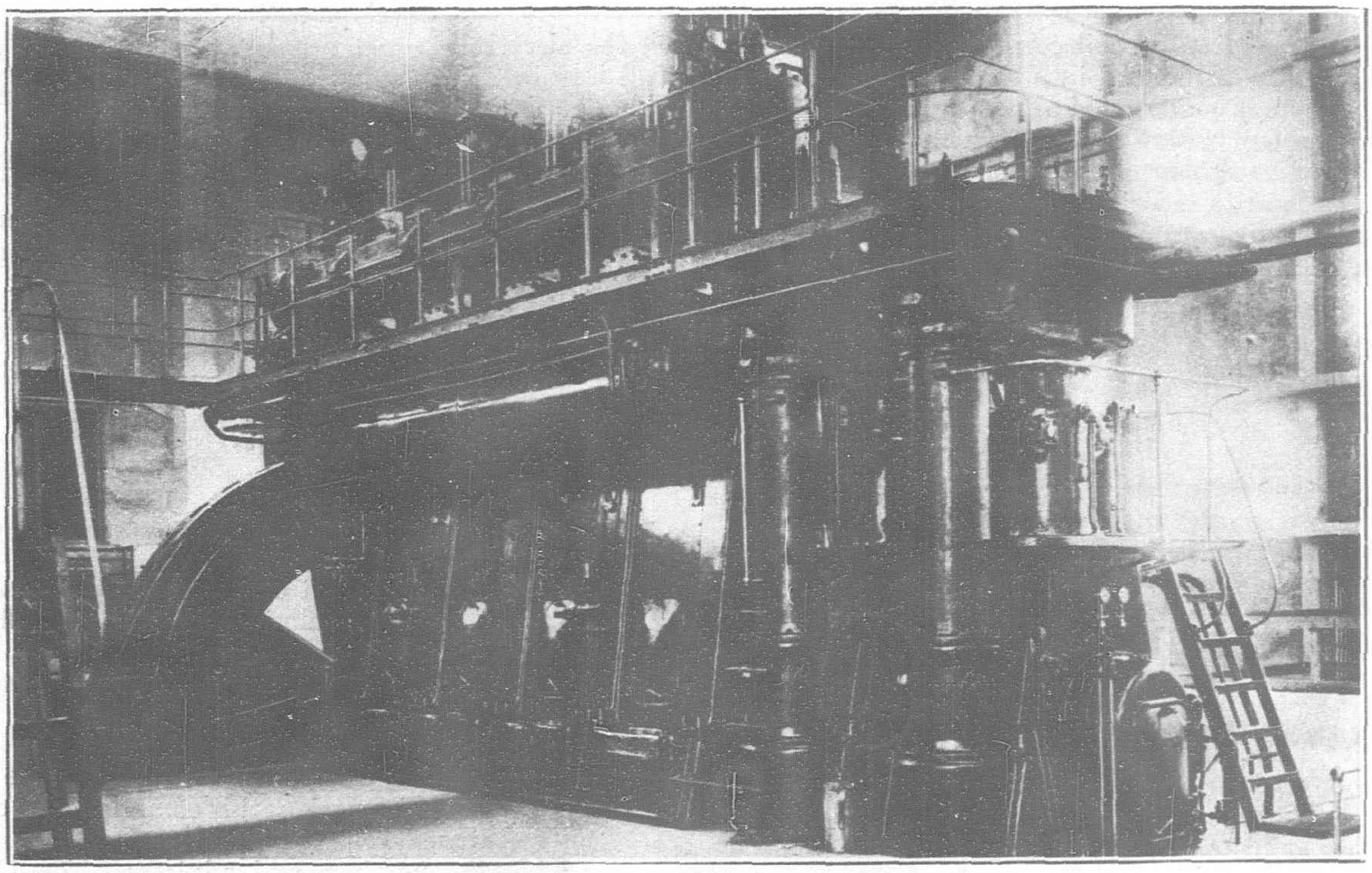
The largest use of the power generated will continue to be domestic, as there are few industrial plants in the French concession, due to the absence of an internal waterway, and to other reasons. The tramways are expected to take something over 500 kilowatts, while street lighting will also take a certain amount of power.

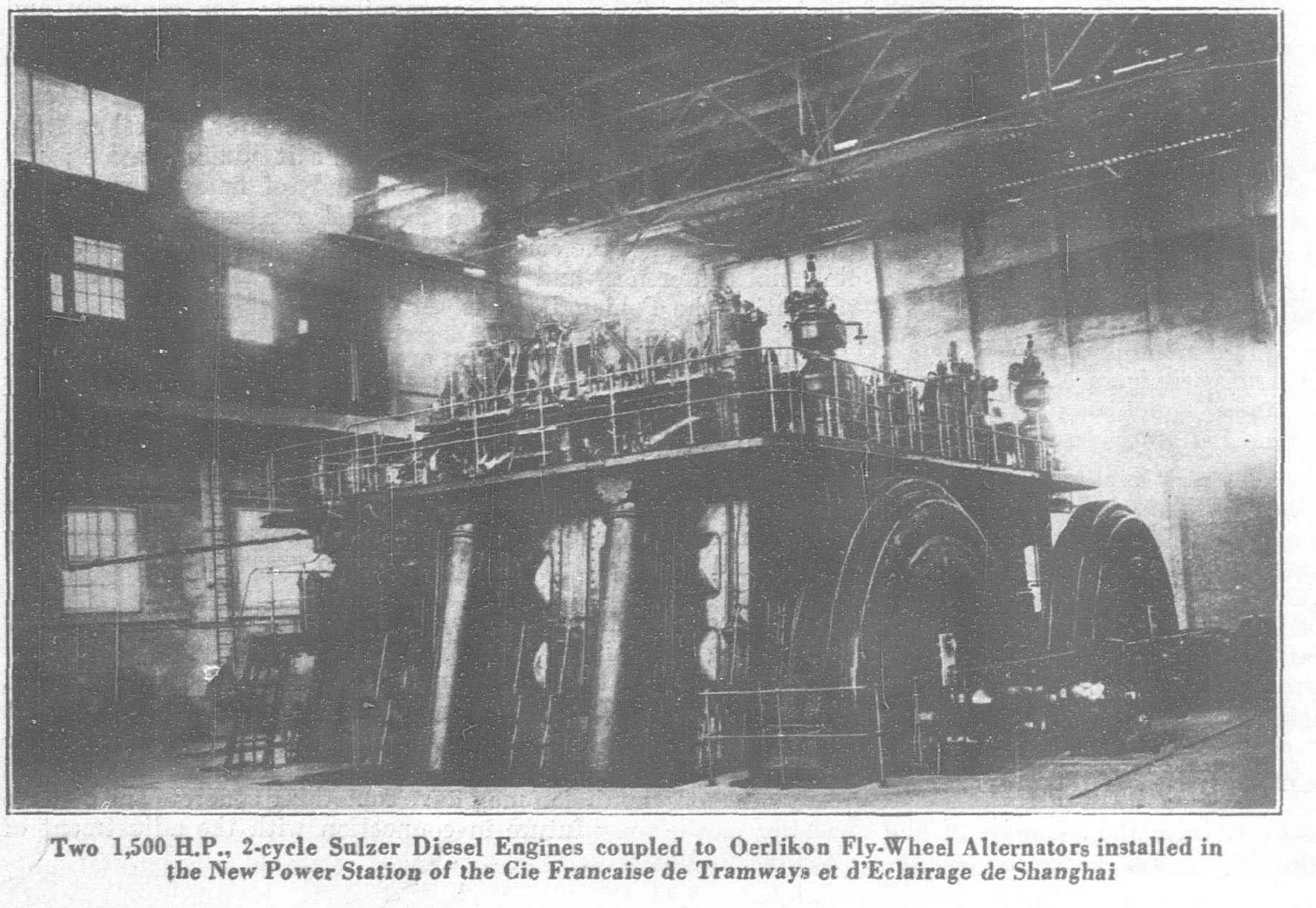
Sub-station transformers all over the concession will step down the current to 200 volts for motors and 110 volts for lights. Six new large transformer stations are to be erected this year throughout the concession; these are in addition to about 15 smaller stations now working.

Twenty kilometres of underground armored cable have been laid and more than sixty kilometrers of bare copper wiring overhead have been strung for streel lighting and domestic use.

The material for the new plant is almost entirely French, except for the Diesel motors of the generating sets which are Swiss, manufactured by Sulzer Brothers. Most of the tenders for equipment have been open to bids from Europe and America. Some of the equipment has been obtained by the Paris office and some here in Shanghai.

In spite of the unfavorable conditions of production in the French concession compared with other larger installations, supplying larger areas, and in spite of the expensive extensions necessary due to the sparseness of the population in the outlying regions of the concession, the company has nevertheless succeeded in selling current at the same rates as other larger undertakings here and elsewhere.

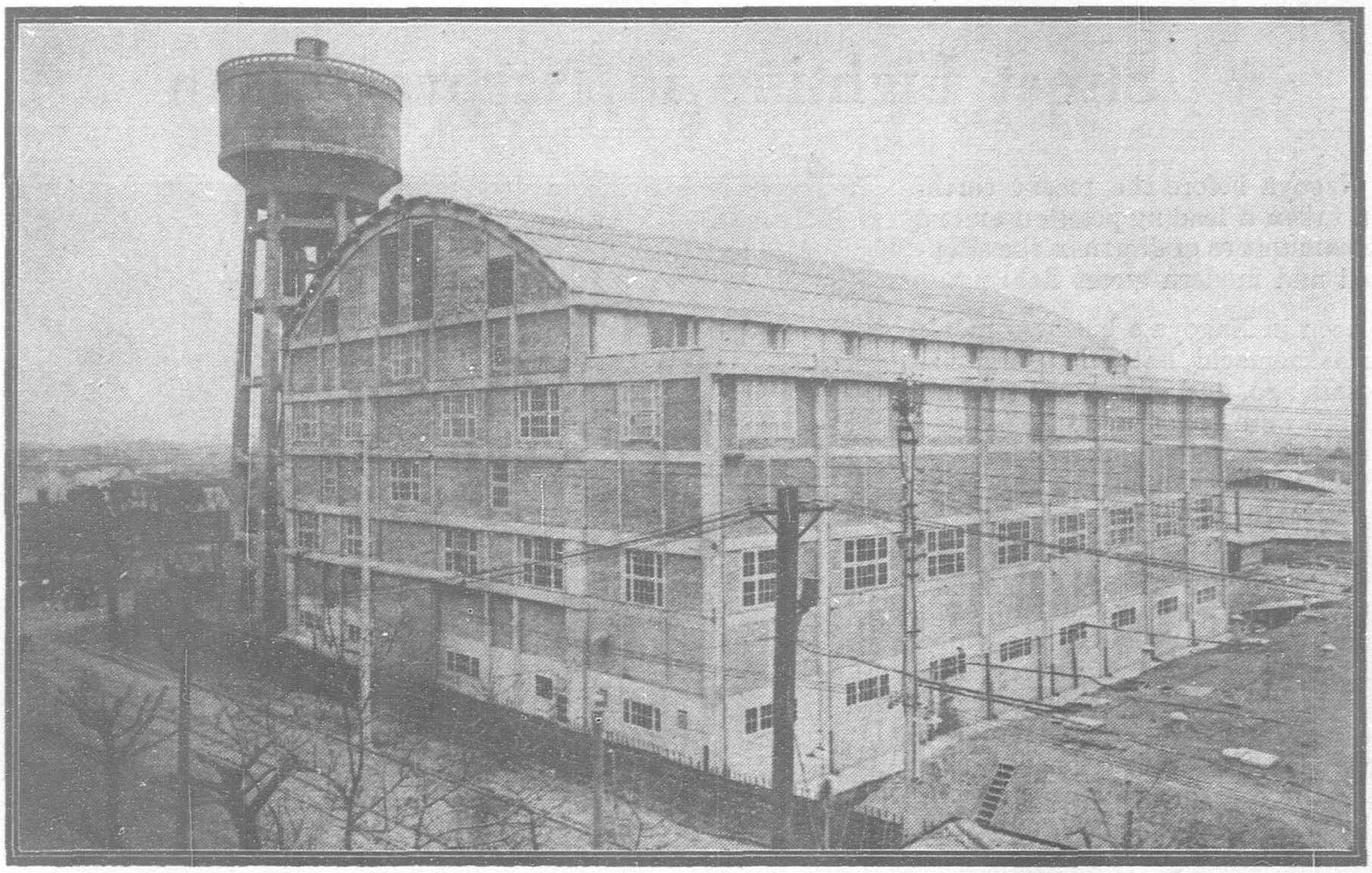




Two 1,500 H.P., 2-cycle Sulzer Diesel Engines coupled to Oerlikon Fly-Wheel Alternators installed in the New Power Station of the Cie Francaise de Tramways et d'Eclairage de Shanghai

Water Supply

In carrying out its program of improving the water supply, the company has constructed a new pumping station taking water from the Whangpoo River. New pre-filters and filters have been constructed, and the total filtering surface has already been doubled, while preliminary alum treated has been adopted by the company. These installations have been made after examination of the most modern European and American plants, and the water now obtained has a limpidity and a clarity which it has never prviously had.



The Power Plant of the Cie Francaise de Tramways et d'Eclairage Electrique de Shanghai

This new generating plant at Lukawei is the central unit in a four years' extension program, of which two years' work has been completed. The third and fourth units are to be installed in 1924 and 1925. The plant is constructed so that it can be extended to the west. The switchboards are on the reader's right-hand side of the building. On the other side is one of the new clear-water reservoirs, with a capacity of 400 cubic metres

The company will also construct this year a supplementary reservoir with a capacity of 4,500 cubic metres, raising the reserve supply of clear water to nearly 10,000 cubic metres, sufficient to provide for a daily consumption of about 40,000 cubic metres.

A new clear-water pump has similarly been installed at Tunkadoo to supply the new reservoir there, which has a capacity of 1,100 cubic metres and will be supplied by a conduit 600 millimetres in diameter and seven and one half kilometres long.

Double Tramway Track

Many new boggie-cars have been added to the equipment of the tram-lines, and these cars have proved very satisfactory for the growing traffic of the company. Owing to the increased traffic upon the Avenue Joffre line, double tracking is being put in, on Avenue Joffre all the way out to Route Say Zoong.

To carry out its ambitious program of extensions the company has a first-class industrial organization of competent and conscientious employees both foreign and Chinese.

The company supplies the French municipality, without charge, with the water for public services and fire-fighting, supplies electricity at half price, and in addition pays taxes, which are increasing each year. The total of its contributions, we are informed, is about one per cent. of the tax-receipts of the French concession.

Increased Capital

The company has made two increases of capital for the carrying out of its four-year program, adding 12,000,000 francs to its previous capital of 8,000,000 francs fully paid up in 32,000 shares of 250 francs apiece. The company was established in 1906 in Paris with an original capital of 3,000,000 francs to take over the existing electric light plant from the French municipality and also to construct tram lines and waterworks. At the time of the transfer the municipality was supplying current to 200 consumers, with 7,500 ten-candle-power lamps. When the company embarked upon its present program, it was supplying 100,000 lights, at high tension of 3,000 volts, which has now been raised to 5,000.—*Shanghai Times.*

Joint Reconstruction of Tokyo

A building construction company is now being projected in Tokyo for the purpose of undertaking "to do civil engineering, construction work and to give loans to building contractors for construction expenses and also to import materials from foreign countries to supply the demand," according to a tentative prospectus received by the far eastern division of the bureau of foreign and domestic commerce from its representative at Tokyo.

This new company is said to include that previously projected and sponsored by the Tokyo chamber of commerce, which was to specialize in the construction of industrial and commercial buildings on the unit basis designed to withstand earthquake shocks.

The new corporation will be known as the "Nichi-Bei Doboku Kabushiki Kaisha," or "Japanese-American Engineers' and Contractors' Corporation," and will be financed and controlled jointly by Americans and Japanese. Head offices will be established in Tokyo with branches in other parts of Japan as may be deemed necessary. The corporation is to be capitalized at 100,000,000 yen ($50,000,000), half of which amount, according to present plans, will be called into the treasury of the company when incorporation is actually effected. Stock certificates are to be issued in denominations of 10, 50, 100 and 1,000 yen, and will be printed in both English and Japanese.

The shares will be divided equally between Japanese and American citizens, it is said, insuring joint control of the venture.

This project differs from the original company planned in that it proposes not only to participate in the work of reconstruction throughout the devastated area but to undertake to carry out building projects in other parts of Japan and the far east and to engage in the importing business.

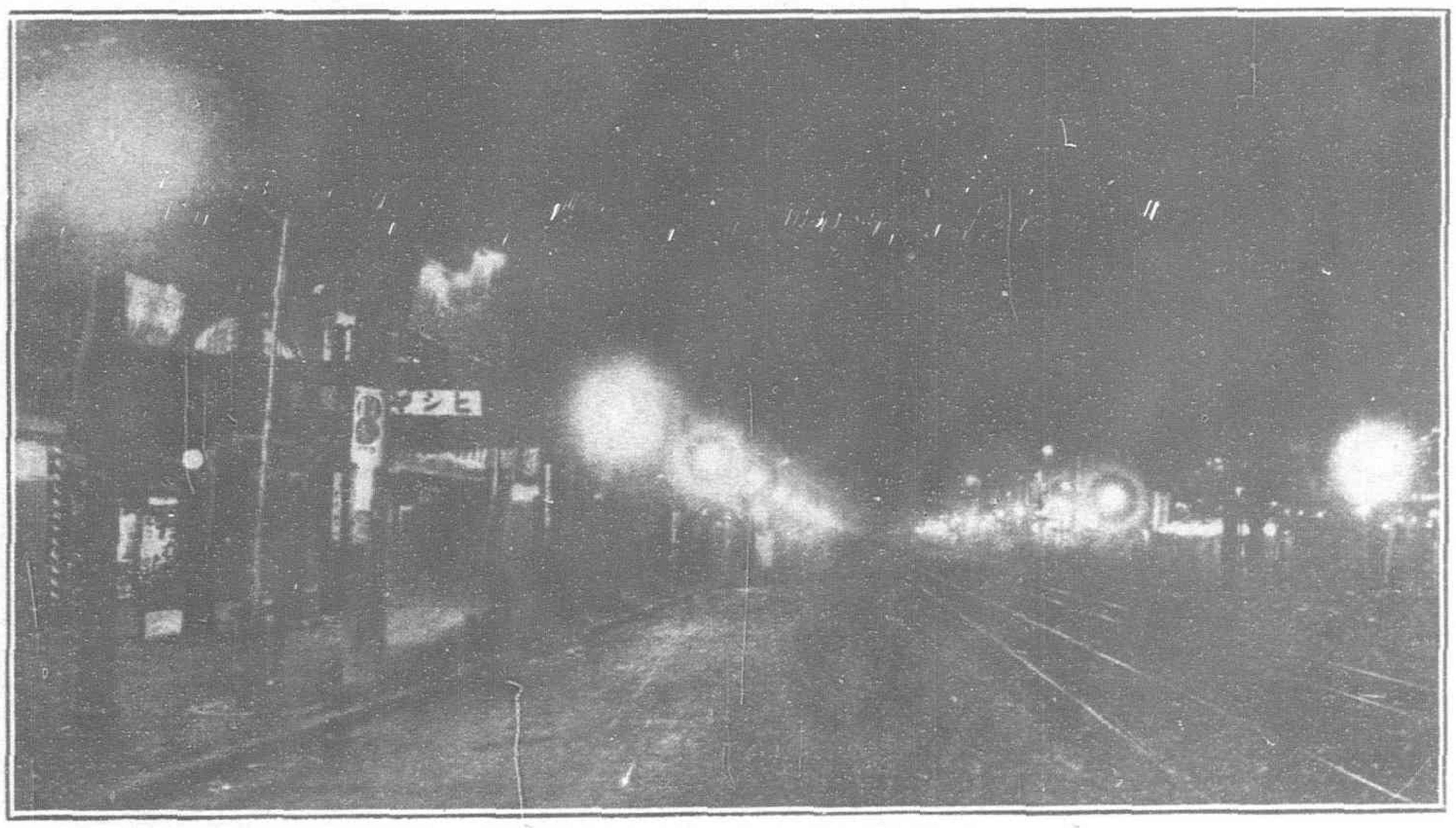
According to article five in the prospectus the life of the corporation shall be twenty years from the date of establishment, but this period can be lengthened or shortened in accordance with resolutions passed by the shareholders at a general meeting.

Technical skill, machinery, and building materials needed in carrying out the plans of the corporation are to be secured in the United States according to present plans.

Street Lighting in Nagoya, Japan

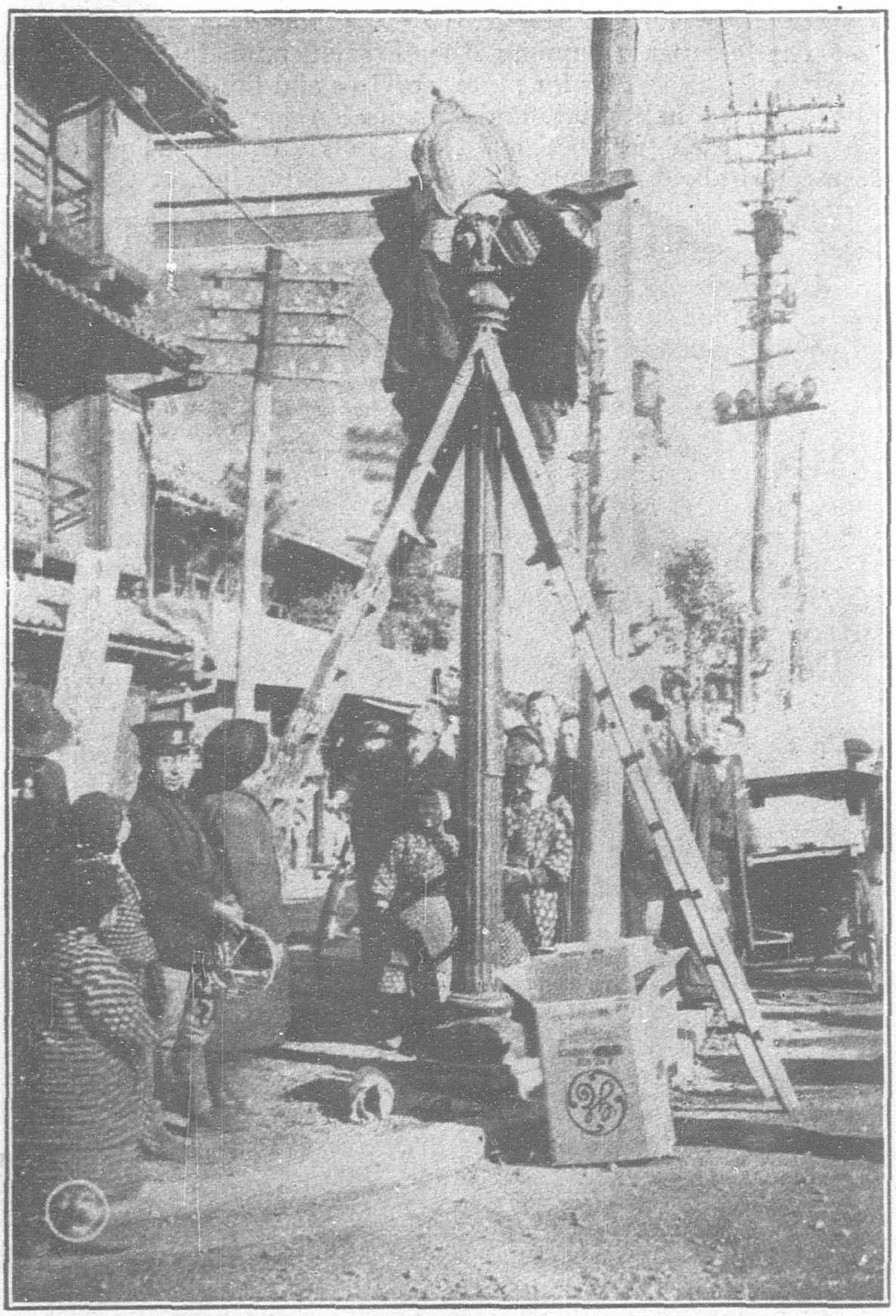
THE city of Nagoya before the recent earthquake had taken a leading position among its sister communities of Japan in the adoption of improved and modern street lighting.

There has been in Nagoya a business men's association, the sakaemachi hattenkai, organized some four years ago, and it was due to their initiative that steps were taken to adopt for one of its leading streets a method of illumination that is a credit and an ornament to the city. The well-known series incandescent system of the General Electric Company was chosen and the lamps are Mazdas, made in Japan by the Tokyo Electric Company. The lamp standards, each with a single unit at its top enclosed in a globe of softly luminous glass, present a very fine appearance which is enhanced by the absence of overhead wires, as the lamps are fed from a circuit underground. The installation of this service was made the occasion of a celebration, participated in by the sakaemachi hattenkai, the chamber of commerce and city officials.



Modern Street Lighting in Nagoya.

Another business men's association, the shinyan agimachi, took up the movement better lighting and were responsible for an extension of the system on the same street—the broadway of Nagoya. The completed installation produced a continuous "White Way" extending to a distance of three kilometres—nearly two miles. As so generally happens incidental to the introduction of a better lighting system, other improvements followed. The street was widened and paved with asphalt, and the locality became a centre of attraction, to the obvious advantage of shopkeepers and business enterprises in general.



G. E. Madza Lamps used in Lighting the City of Nagoya.

Carpet Industry in China

Rapid expansion of the Chinese carpet weaving industry, centered about Tientsin, in the northern part of China is attracting the attention of exporters, and the Chinese maritime customs report for that city, states that in 1922, 3,321,541 square feet of carpet, valued at 2,893,568 haikwan taels, or about $2,160,000 was exported.

In 1921 there were 2,122,520 square feet shipped from Tientsin. The United States ordered most of them, the quality being of special Chinese designs of 90 strings, and fairly long pile.

In North China a number of years ago catholic fathers having a large orphanage near Peking constructed looms and in a small way began weaving and experimenting, employing the boys for whom they cared. As the orphans left the school they carried their trade outside.

Nearly all carpets exported are made on home looms. In Peking one may see at the rear of the carpet shops sheds where balls of heavy whool are being made into carpets, some of them in reserved, obscure and pleasing designs. These shops are to be found many in a row on Carpet street.

The place where the weaving is done is frequently similar to a cow shed, with a long weaving frame of heavy timber against either side. At each frame work six or eight or ten boys and men. The design they are following has been traced for them on the upright strings through which they weave.

One of the drawbacks to the buying of carpets by foreigners who live in China is the matter of design. The patterns and colors have until recently, when drawn by the Chinese at home been loud. This has been overcome somewhat by exporting firms designing their own styles. This has even been done by individual householders. Rug designs about Shanghai seem all to run to dragons. These are now being eagerly bought by the thousands of fairly well to do Chinese who are copying foreign homes but not foreign decorations.

Shoppers in Peking say they find rugs more after the foreign wish there than elsewhere. Favorite colors are dark blues, grays, browns. Into these small, inoffensive figures are worked in by the use of slightly shorter yarn.

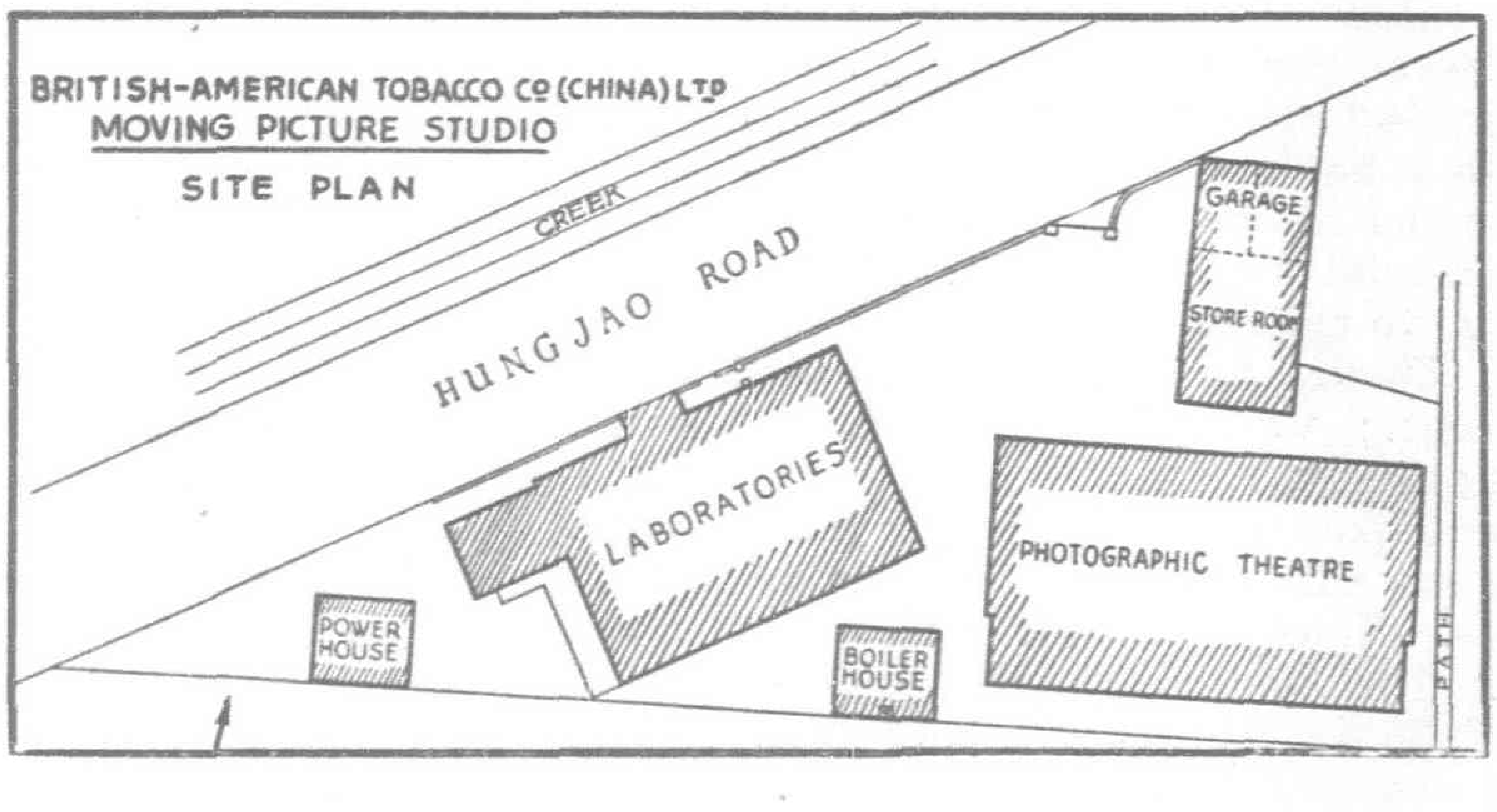
B.-A. T. Movie Plant

By Robert Forsythe

A PLANT for the production and handling of motion pictures is now under construction in Shanghai which will use electricity capable of developing 240 horsepower, or the equivalent of 50,000 candle-power. This plant, the result of the last year's work of the British-American Tobacco Company's moving picture department, is planned to turn out some 200,000 feet of film monthly when completely installed, for use in the educational program of the company. During the recent visit of Sir Hugo Cunliffe-Owen, chairman of the company, plans were perfected by Mr. W. H. Jansen, the organizer of the present motion picture plant, for the new laboratory, studio, and photograph theatre, and these plans received the approval of Sir Hugo, following which work was immediately begun.

The new plant, which will be unique in the Far East, is to be located on Hungjao Road, about 200 yards from Avenue Haig, near the Nanyang College. It will consist of a two-storey laboratory with facilities for toning, coloring, drying, developing, copying, cartooning, title writing, research, cutting, and a mess room; a photographic theatre over one hundred feet long with scene-painting, carpenter, and property rooms; a garage, and a special transformer station to take electric power from the cables of the municipal electricity department without interfering with neighboring circuits.

Although the company has been producing films for over a year the new studio will have the bisset production by electric lighting and not sun-light, and for this purpose an extremely heavy volume of electricity will be used. By special arrangement with the municipal electricity department a transformer station on the premises will step-down the main cable municipal voltage from 5,000 volts to 200 volts and a special central control system will be installed in the new plant similar to that in use in the studios of Hollywood. When in full operation the plant will be taking a thousand amperes of light at 200 volts, a large part of which will be used by four 75-ampere lamps, eight 35-ampere lamps, and one 120-ampere lamp. These will be used in the studio to give full lights, side lights, and powerful overhead light shining down upon the actors. For the latter effect a large Winfield-Kerner dome has been recently received from America which will blaze with four powerful arcs.



Besides branching into the new field of indoor film work, the company will continue to expand its present all China film service, and a special camera man will be permanently stationed in each of the important news centres of China, Hongkong, Shanghai, Hankow, Peking, Tientsin, and Manchuria (the latter covering Harbin, Mukden, and Dairen), and it is expected that by the end of the year a bi-weekly all-China news-reel will be distributed by the company throughout the country. In addition to these six men at fixed points, two men will be kept constantly traveling about China taking scenic pictures.

The centre of this system will be the new laboratory. To this the negatives will be sent in from all parts of China, and from here the finished films will be sent out to all parts of China for release. The laboratory which will be of concrete is planned to handle, with its space and equipment, 200,000 feet of film a month, as this much is considered necessary to satisfactorily cover the China news field.

On the ground floor is the toning and coloring room, where the films will be colored in six different shades, as provisions have been made that all the films turned out by the new plant will be colored. With the present plant, coloring has only been possible with two shades and under difficult conditions, but a much larger range will be made possible in the new plant.

Next to the toning and coloring room will be the developing room. A novel arrangement will allow the films to go rapidly and automatically through the developing room onto the drying drums in the drying room, which will be fifty feet long.

From here the negative film will pass to the printing room where there are four of the most up-to-date printing machines

The mechanical side of moving picture production is fast becoming a highly technical industry, and the delicate and complicated mechanism of the printing machine is particular evidence. When the photographer gets out into the field, the day may be sunny and bright, or dark and rainy. In spite of his technical skill his negatives naturally have not a uniform exposure, and some are faint while others are sharp. On the other hand moving picture audiences demand that the moving pictures shown must be absolutely uniform in their lighting. It becomes necessary, therefore, to make the highly delicate adjustment during the printing. Amateur and professional photographers are able to do this with individual films without difficulty, but when it comes to thousands of feet of film containing scores of thousands of separate pictures, it becomes a difficult thing.

For this process, the new printing machines to be installed by the company at Hungjao Road will use a so-called "master film." This will automatically register the amount of light needed, and is run through the printing machine in parallel with the negative. It controls the light within the machine, automatically increasing it for strong negatives and decreasing it for weak negatives.

Next to the printing room is the cartooning room, where the animated advertising sketches and other additions to the regular film are made. The rest of the floor is taken up with a fire-proof vault where films are stored. All the most modern plumbing accommodations are to be installed for the personnel.

On the second floor of the laboratory is the 40-foot projection room, where films will be tested and screened. A large art department will house the staff of those who do the title writing in English and Chinese, and will do the art work for the decorations, etc.

A special library of Chinese geography, history, and literature, will be kept for reference and use by the scenario department in making Chinese films. On the same floor will be the cutting and joining room, where the unnecessary parts of the films will be shroffed out, and the cut ends joined. Several remarkable machines have been obtained for this purpose, which glue together the severed ends with an overlap of only an 16th of an inch and with a tension equal to the rest of the film. A special elevator will connect this room with the fire-proof vault below. Special mess-quarters will be provided in this building for the staff.

The other large building, the photographic studio, will be 101 feet long by 55 feet wide, and the main studio will be 25 feet high at the eaves and 40 feet at the ridge-pole. In the centre of the studio will be a tank and pool for water scenes, which will be planked over on ordinary occasions. Separate ladies' and men's dressing rooms will be in the same building, together with a scenic department where the backgrounds and stage-scenery will be prepared. A large carpentry shop and a property room will complete the building.

Construction work will be concentrated on the photographic theatre, and this is expected to be in use by the middle of June of this year, while the laboratory will be in use by the middle of September. Quantities of machinery and equipment have already arrived from America, including practically all the lighting equipment.

The moving picture department of the British-American Tobacco Co. has now been in operation a year, was started last year by the single-handed efforts of its present manager, Mr. Jansen, who has enlarged it now until the work requires a staff of almost thirty, which will be increased with the taking over of the new plant. Up to date it has been housed in a private house leased for the purpose, but the work has expanded beyond the space available; the cutting and joining room has been forced up into the attic, the art department with a staff of six men is cramped into one small room, and the projecting room only allows fifteen feet of throw from the machine to the small canvas. Developing and printing processes have been cramped in small rooms intended for other purposes, and coloring of the films has had to be done in the garage. The new plant will therefore give a welcome chance for working under more favorable conditions.

As an instance, however, of the present available staff, the war memorial unveiling pictures released last week were taken with three cameras; recent paper hunt pictures were taken with five cameras, and Manager Jansen has been in a position at times to put as many as eleven men on an important assignment.

It is also planned to develop a department of industrial films, showing the processes and development of important industries in China. This will be done in story form similar to the Shanghai police picture "511" which gave the steps in a policeman's career and showed the police department in story form.

These films are, and will continue to be, distributed free of charge. Advertising is, of course, the primary object of the company, but the films are also intended to perform a valuable educational rôle, informing the Chinese about their own country, and also about the modern changes which are going on in China. Just as the British-American Tobacco Company is probably the only company in the world engaging on such a large scale in this novel form of advertising, so probably China is the only country being so thorough-covered by non-commercial film service.

For the elimination of any possible race feeling which might creep into the films, every title and sub-head is carefully shroffed twice over, while each film is subject to careful examination lest anything which might cause friction or race antagonism might creep in.

It is estimated that between three and four hundred Chinese see these films for every one foreigner. After they have been released at the Carlton Theatre and other large foreign film-houses in Shanghai, the films go to Wing On's, the Great World, the Old World, and a dozen large Chinese cinema houses in the settlement.

Every one of the five distributing points has a complete circuit. As an example of the size of these circuits, the films which go to Hongkong are exhibited also in Canton, Macao, Sanshui, Swatow, and Amoy, and in intermediate cities.

During the summer months twelve large projectors for open-air theatres will be constantly moving about the country showing the films.

It is estimated that the new film service will be reaching the considerable number of 10,000,000 people by the end of 1924, a monument to the resourcefulness, the organizing ability, and the enterprise of the moving picture department, its staff, and its head. Mr. Jansen's progress was made possible through the untiring efforts and co-operation of the company's progressive board of directors.

Japan, America's Best Customer

Few people fully realize the extent of Japan's economic relations with the United States. Seven per cent. of Japan's total national wealth is annually engaged in foreign trade, whereas only 2 per cent. of our national wealth is so engaged. Theoretically, therefore, Japan is three times as much interested in what goes on outside its own domain in a commercial way as we are. Forty-five per cent. of Japan's exports go to the United States, making us by far Japan's best customer; China is second, taking 24 per cent.; India third, with 6 per cent.; while France and Great Britain take 5 and 3 per cent, respectively.

Five commodities exported by Japan account for 66 per cent. of its total export trade. Of these raw silk ranks first, constituting 41 per cent. of all Japan's exports. Ninety per cent. of this raw silk is sold to the United States. The American market for raw silk, therefore, provides Japan with 36 per cent. of its export trade. There are few instances in which one country purchases so large a share of the principal exported commodity of another. Cotton goods, including yarn and piece goods, make up 18 per cent. of Japan's exports. The market for these goods is found almost entirely in the far east. Silk goods, including habutae, pongee, and Fuji silk, constitute 5 per cent., pottery 1 per cent., and tea 1 per cent. The United States takes a large share of all these—a quarter of the silk goods, a third of the pottery, and 90 per cent. of the tea. In addition to these five major items of export to the United States, whose total in 1922 amounted to $329,000,000, Japan sends us a number of commodities of lesser value, including camphor, straw braid, waste silk, brushes, comestibles, beans, toys, buttons, paper goods, lamps, matches, etc., whose aggregate was $37,000,000, making the total exports to this country $366,000,000. The United States is Japan's principal market for most of these exports, but their total accounted for less than 9 per cent. of our total imports, and most of them are luxuries or semi-luxuries The position of the United States as a market for these products, however, is a most important factor in Japan's economic life.

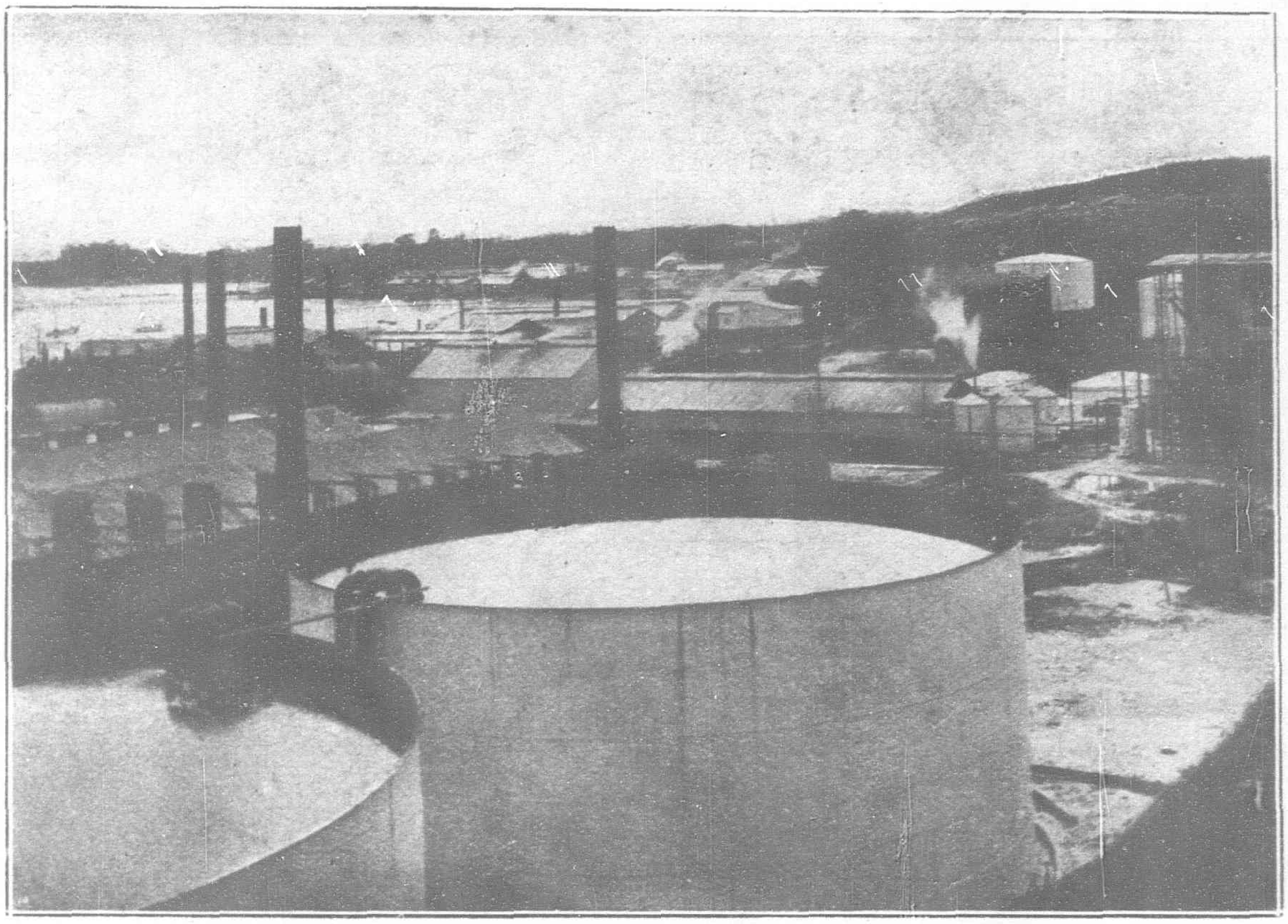
The United States is Japan's principal source of supply, 31 per cent. of Japan's 1922 imports coming from this country. We supplied to Japan more than twice as much in value as any other country, India being second with 14 per cent., Great Britain third with 13 per cent., China fourth with 10 per cent, Kwantung Leased Territory 8 per cent., Germany 6 per cent, Australia 4 per cent., and all others 14 per cent. Our principal export was raw cotton, which, while only one-quarter of Japan's raw cotton imports in quantity, amounted to 40 per cent. of the value. We supplied 41 per cent. of Japan's machinery imports, 70 per cent. of the lumber, 60 per cent. of the iron bars, rods, and plates, 80 per cent. of the kerosene, 93 per cent. of the sulphate of ammonia, and 80 per cent. of the construction material. These purchases from the United States totaled $202,000,000. We supplied an additional $96,000,000 in such items as automobiles, leather, iron tubes, paper and paper pulp, nails, railroad equipment, lead, caustic soda, etc.

Many of these commodities are essential to Japan's industrial life. A few of them could be obtained in quantity only from the United States. Most of them are competitive in the sense that substitutes can be obtained, but such substitutes would not be of the quality desired. Our long-staple cotton, for example, is essential to mix with the short staple from India. Certain types of our machinery are much more suitable for Japan's needs than similar machinery from other countries. Our lumber is comparatively cheap and of satisfactory grade, while our construction material is bought to assure satisfactory building of modern fireproof structures. Eighty per cent. of Japan's automobile imports are of American make, because our cars are lighter and less expensive to run.

While all these sales of materials, more or less essential to Japan, cause the United States to loom large in Japan's foreign trade, Japan takes but 6 per cent. of our total exports, ranking fifth, after Great Britain, Canada, Germany, and France. While Japan's purchases of our raw cotton, machinery, lumber, iron and steel, kerosene, heavy chemicals, and construction material constitute only a small percentage of our production of these commodities, it is important to note that, as regards our exports of such merchandise, especially lumber and iron and steel, Japan is our best customer.—Frank R. Eldridge.

Iron and Coal in Mongolia

Advices from Harbin indicate that the Russians have paid special attention to the mineral resources of Mongolia since their occupation of Urga and Kiachta. A large number of experts have been sent out all over Mongolia to discover mines, and as a result they have now found three large iron mines, nine coal mines, two copper mines, one crystal mine and one gold mine. The last mentioned mine has attracted their special attention because the ore contains a large proportion of gold and the veins are exceedingly rich, richer than those found in Siberia. The Russians are raising a very large capital and will embark in the enterprise on a large scale.



The Refinery at Balik Papan

Petroleum Production and Trade of the Dutch East Indies

By Albert T. Coumbe, Jr., Petroleum Division, Bureau of Foreign and Domestic Commerce, U.S. Department of Commerce

THE Dutch East Indies, which comprise Sumatra, Java, Borneo, Celebes, Western New Guinea, Timor, and numerous smaller islands, cover an area of about 750,000 square miles and support a population of approximately 50,000,000. Although these people consume annually about 5.5 gallons of petroleum products per capita, which is the highest rate in the Orient, there is not the quantity consumption, and consequently not the present and future field for American exporters, that is to be found in British India and China, where there are populations totaling hundreds of millions. The Royal Dutch Co., incorporated in the Netherlands, is strongly entrenched in these Dutch colonies and it carries on practically all the local production and refining, besides holding the larger share of the market for petroleum products.

The crude production of these Dutch dependencies amounts to more than 16,000,000 barrels annually, or about 2 per cent. of the world's petroleum output. The Dutch East Indies ranked fourth among producing nations for 1921 and fifth in the estimated totals for 1922, having been displaced by Persia.

During 1921 these islands exported about 473,000,000 gallons of petroleum products, exclusive of paraffin, grease, asphalt, and other solid products. The imports for the same period amounted to approximately 33,000,000 gallons, valued at a little more than $12,000,000. The share of the United States in this import trade totaled 51.2 per cent. of the quantity and 55 per cent. of the value.

Production of Crude Petroleum

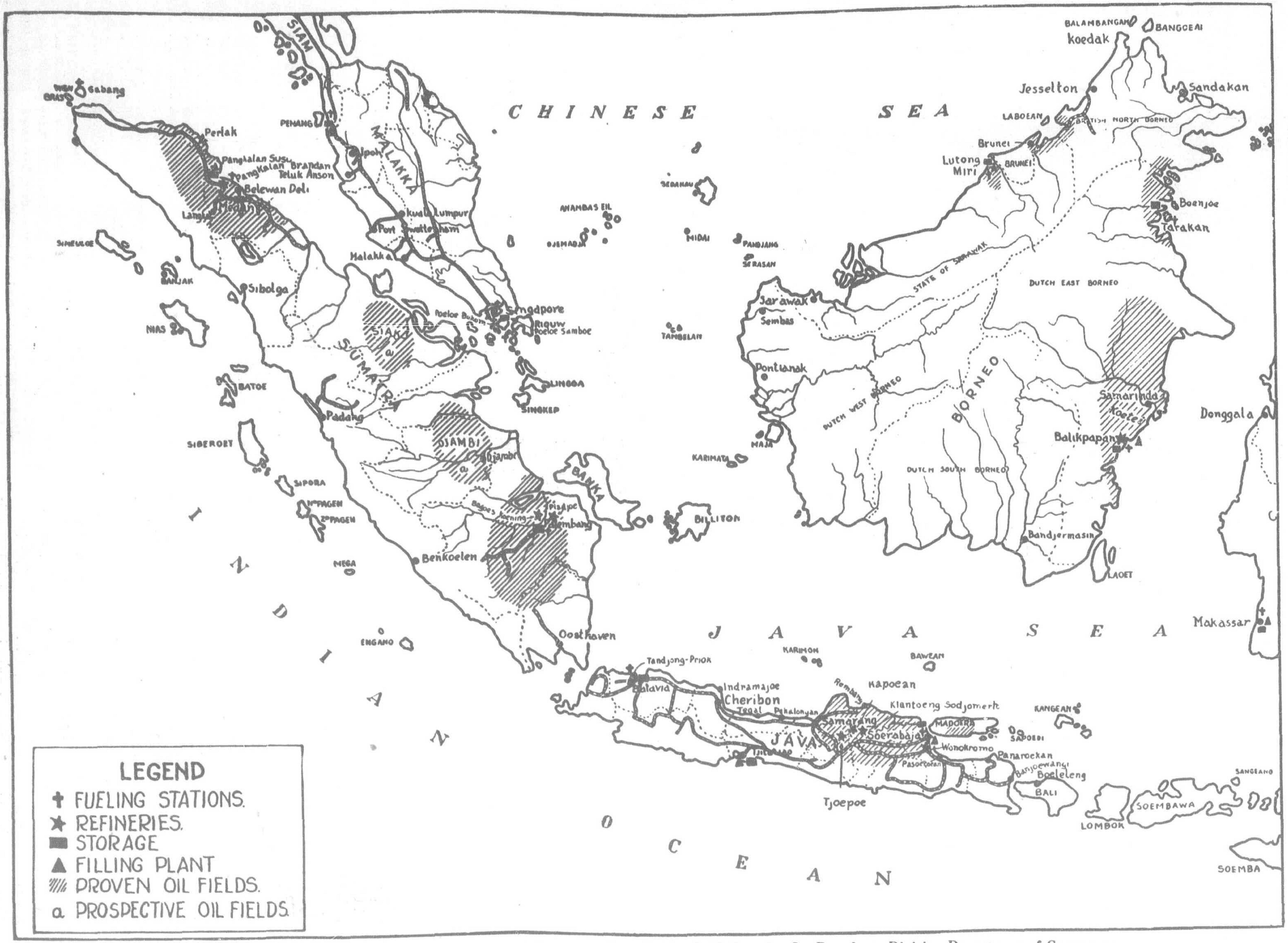
The proven petroleum areas of the Dutch East Indies are in the southern and eastern divisions of Borneo; in the residencies of Semarang, Rembang, and Soerabaya of Java; and in the Palembang, Oostkust, and Atjeh residencies of Sumatra. There is also a small commercial production in Madeora, a small island northeast of Java, as well as in the island of Ceram in the Moluccas.

Following are tables of crude-oil production :—

CRUDE OIL PRODUCTION OF DUTCH EAST INDIES

Districts.	1912	1920	1921
Java :	*Barrels.*	*Barrels.*	*Barrels.*
Rembang	904,217	1,866,181	1,529,204
Semarang	2,389	243,321	37,889
Soerabaya	432,261	426,383	446,227
Madoera	...	180	22
Total	1,338,867	2,536,065	2,013,342
Sumatra :			
South Paiembang ...	2,027,889	1,465,816	1,566,834
North Palembang ...		995,169	946,977
East Coast	1,237,094	404,640	429,901
Ktjeh	1,490,005	994,349	1,341,939
Total	4,754,988	3,859,974	4,285,651
Borneo :			
Koetei	3,243,837	5,353,936	5,334,848
Tarakan	1,594,355	5,116,429	5,002,777
Total	4,838,192	10,470,365	10,337,625
Island of Ceram	—	152,076	354,440
Grand Total ...	10,932,047	17,018,480	16,991,058

Note.—Conversions have been made at the rate of 7.195 barrels to the metric ton. Source : Jaarboek van het Mijnwezer in Nederlandsch Oost-Indie.



Petroleum Map of the Dutch East Indies and British Borneo. Compiled by A. T. Coumbe, Jr., Petroleum Division Department of Commerce

PETROLEUM PRODUCTION BY CONCESSIONS.

[Source : Jaarboek van het Mijnwezen in Nederlandsch Oost-Indie.]

Name and location of concession	Owner	Area Hectares*	Production		
			Metric ton†	Metric ton†	Metric ton†
Java :					
Semarang Residency—					
Klantoeng Sodjomerto	Algemeene Petroleum	196	38	343	360
Bapo	Petreoleum Co. Gaboes	155	295	6,857	33,458
Soerabaya Residency—					
Djabakotta	Dordtsche Petroleum Co.	15,470	1,566	1,292	1,142
De Twaalf Dessas	do.	1,711	18,793	18,925	19,031
Lidah Koelon	do.	887	7,902	7,115	6,966
Metatoe	do.	17,318	1,188	58	355
Made	do.	1,914	29,737	29,589	31,756
Petiken	Oriental Petroleum Co.	1,219	893	9	11
Rembang Residency—					
Tinawoen	Dordtsche Petroleum Co.	21,454	67,105	96,754	113,407
Panolan	do.	8,499	32,923	55,557	106,130
Djepon	do.	17,994	17,345	26,257	25,899
Toengkoel	do.	704	1	—	—
Banjoebang	do.	1,803	2,328	9,310	6,797
Plantoengan	do.	949	321	146	127
Kalipiting	do.	1,076	529	237	211
Tjandi	do.	590	1,033	—	—
Trembes	do.	814	619	—	—
Metes	do.	1,804	1,593	—	—
Wonosari	do.	1,760	1,722	74	—
Gegoenoeng	do.	1,110	154	1,324	3,169
Petak	Nedlandsche Koloniale Petroleum Co.	1,903	—	3,791	3,069
Temboel	do.	1,930	—	879	562
Madoera :					
Lerpak	Madoera Petroleum Co.	1,989	—	140	25
Sumatra :					
Atjeh Residency—					
Peureula	Perlak Petroleum Co.	4,037	188,993	132,560	129,800
Zuid-Perlak	Petroleum Co. Z. Perlak	3,296	16,749	8,993	8,235
Oost-Peudawa	Royal Dutch	385	1,348	336	165
East Coast Residency—					
Aroebaai	do.	44,679	—	16,626	40,436
Telaga Said	do.	355	7,026	5,544	5,452
Boekit Mas	do.	37,699	27	—	25
Boekit Sintang	do.	160	430	492	424
Boeloe Telang	Mining, Timber & Agriculture Co. in Langkat	5,393	164,455	11,909	9,902
Palembang Residency—					
Moeara Enim	Royal Dutch	22,144	92,535	88,235	104,376
Bata I	do.	7,124	27,087	70,699	59,475
Bandjarsari	do.	2,581	9,016	4,723	4,771
Soeban Djergi	do.	4,660	116,125	78,843	66,103
Sumpal	do.	4,400	11,417	10,161	9,200
Karang Ringin	Petroleum Co., Moesi-Ilir	4,988	6,202	4,208	3,975
Ladang Part	Ned. Ind. Exp. Co.	395	2,027	3,603	2,978
Lematang	Exploration Co., Netherlands	1,838	9,080	6,979	6,479
Arahan	do.	1,907	2,269	5,331	5,593
Ramok	Bataafsche Pet. Co.	501	6,004	10,236	14,120
Soengei Langoe	do.	1,091	—	—	17
West Senabing	do.	2,825	—	1,665	1,404
Kloeang	do.	2,349	—	379	764
Soeban Boeroeng‡	do.	8,800	—	52,996	53,327
Tandjoeng Loentar	do.	1,151	85	991	864
Kali Berau	do.	3,203	—	1,758	—
Kenawang	do.	3,942	—	2,488	3,829
Grissik	do.	2,254	—	1,275	966
Berau	do.	2,804	—	1	1,665
West Kali Berau	do.	1,900	—	109	702
Djernch	Dordtsche Pet. Co.	2,188	—	1	—
Kajoe Aro	Ned. Kol. Pet. Co.	3,857	—	3	—
Mambang	do.	702	—	63	—
Talang Akar	do.	2,461	—	552	1,433
Borneo : South and east division—					
Koetei I	do.	3,975	—	65	—
Sadjau	do.	3,665	—	99	99
Moeara	Royal Dutch	18,050	26,715	68,981	102,992
Louise	N. I. Ind. & Trading Co.	20,509	370,278	488,359	454,387
Nonny	do.	135,250	53,852	212,359	186,740
Tarakan I	Royal Dutch	4,951	2,613	325,830	406,995
Tarakan II	do.	4,930	218,979	273,648	303,418
Tarakan III	do.	3,938	—	2,101	296
Tarakan IV	do.	3,927	—	699	301
Cream : Boela I and II	Boela Pet Co.	7,697	—	7,311	21,136
	Total	496,220	1,519,397	2,159,868	2,365,319

*1 hectare equals 2.47 acres.

†1 metric ton of the Dutch East Indies crude equals 7,195 barrels (42 gallons.)

‡Formerly the concessions Bentiala, Boeroeng, and Soeban.

Source : Jaarboek van het Mijnwezen in Nederlandsch Oost-Indie.

Dutch Borneo

Dutch Borneo has two main fields, Tarakan and Koetei. The production from Tarakan comes from a small island by the same name which is just off the northeast coast of Borneo. This island was first explored in 1863 by J. H. Menton, a Dutch mining engineer, and oile seepages were reported. The first concession, however—a property of the Koninklyke Nederlandsche Maatschappij (Royal Dutch Co.)—was not taken up until 1905, and one year later the first commercial production of 57,928 barrels was realized. At the present time there are five concessions on record, all being held by the Tarakan Petroleum Maatschappij, but worked under contract by the Bataafsche Petroleum Maatschappij. The petroleum produced, as shown in the above table, was 5,116,429 barrels in 1920 and 5,002,777 barrels in 1921, the latest year for which detailed statistics are available. These totals approximate one-third of the total yield of the Dutch Indies. Tarakan oil has an asphaltic base and a specific gravity of 0.95 to 0.98, contains practically no gasoline, and therefore is generally used as fuel oil after treatment for the removal of sand and water.

The Koetei field in the south and east divisions of Borneo extends along the coast from Balikpapan to Samarinda, although the territory still farther north shows indications for future development. The first concessions were taken up in 1891 by the Netherlands Indies Industry & Trading Co., but the first well was not reported until 1897, when one was sunk at Sanga Sanga. At the present time this field has the largest yield of any in the Indies, with an output of slightly less than 15,000 barrels daily. The horizons or sands give different crudes, from light paraffin to heavy several asphaltic, ranging from 0.84 to 0.96 specific gravity.

Java

There are petroleum seepages in many parts of Java, but the commercial production comes from the shallow sands in the northeastern portion in the residencies of Soerabaya, Rembang, and Semarang. The first concession was taken up in the Soerabaya residency in 1889 by the Dordtsche Petroleum Co., which still operates most of these fields, although the Nederlandsche Koloniale Petroleum Maatschappij, a subsidiary of the Standard Oil Co. of New Jersey, holds several concessions which yield a few thousand barrels annually. The richer deposits are in the Rembang residency, where something over 1,500,000 barrels was the output for 1921. The total Java production for 1921 was 2,013,342 barrels, including a small quantity from the adjacent island of Madoera. The crude from these fields has an asphaltic base, although paraffin is also present. It ranges from 0.825 to 0.916 in specific gravity.

Sumatra

The productive fields of Sumatra are in the Perlak district of the Atjeh residency, in the Langkat district of the Oostkust residency and in the Palembang residency. In 1883 the first concession, known as "Telaga Said," was taken up in the Langkat district. Commercial production dates from 1890, when the above property was bought by the Royal Dutch Co. The Perlak Petroleum Co., in conjunction with the Royal Dutch, started work in the Atjeh residency in 1899 and was granted the Peureula concession. There are seven different holdings there now, all of them directly or indirectly controlled by the Royal Dutch. The 1921 production of the field amounted to 1,341,939 barrels. Late reports mention the entrance of salt water into the petroleum sands.

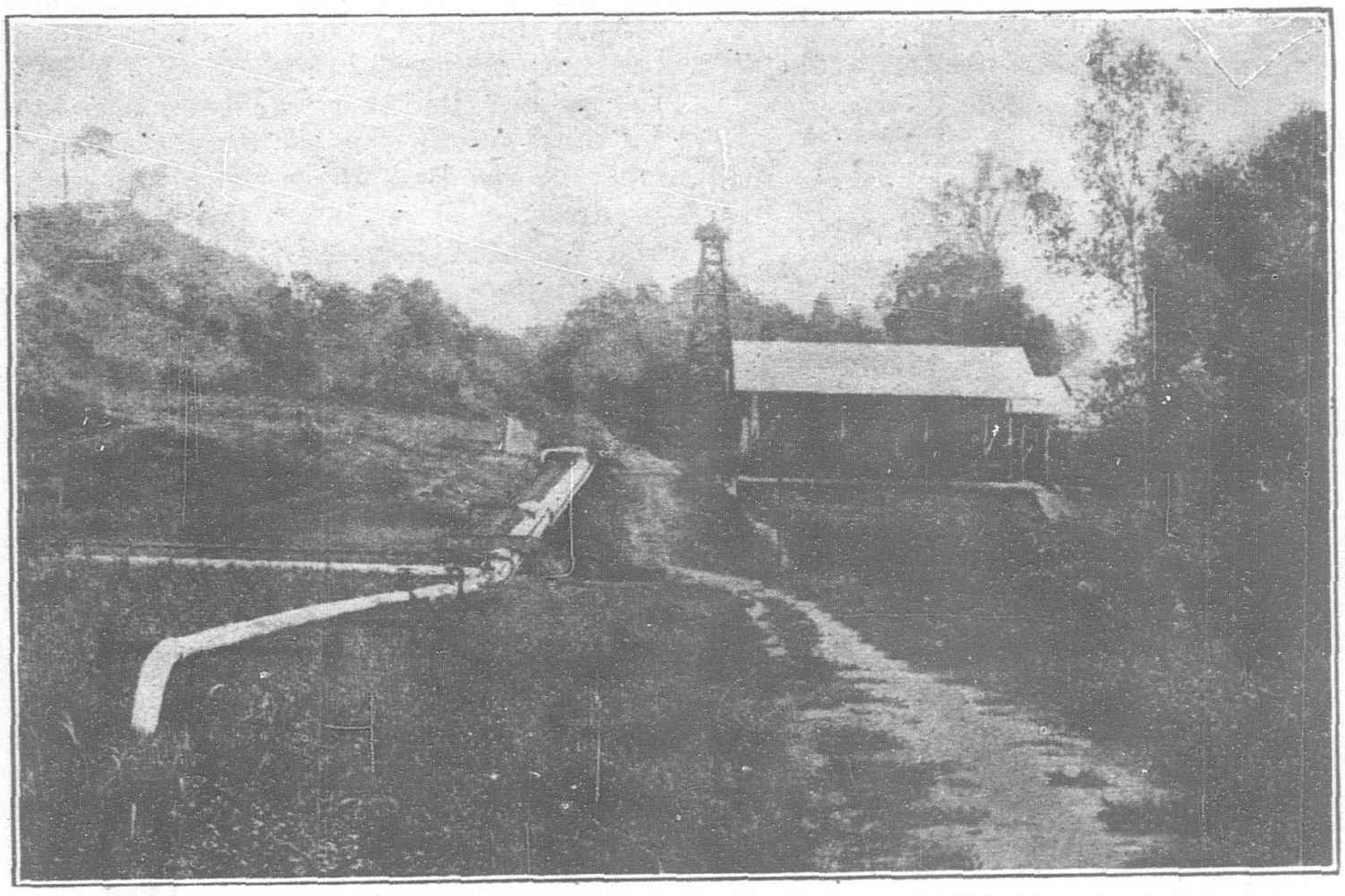
The Moeara Enim Co. and the Sumatra-Palembang Co., both organized in 1897, were the pioneers in the southern Sumatra field of the Palembang residency. The first-mentioned company carried on the bulk of the development in the district until 1904, when the various holdings were bought in by the Royal Dutch. At present this organization controls the entire southern Sumatra district except for a few concessions held by the Nederlandsche Koloniale Petroleum Maatschappij, the subsidiary of the Standard Oil Co. of New Jersey. The 1921 yield totaled 2,513,811 barrels for the residency, or 946,977 and 1,566,834 barrels, respectively, for the north and south fields of the area.

The crudes from the several Sumatran fields vary considerably, but, generally speaking, they are low in paraffin content and yield a high percentage of benzine distillates.

Ceram

There is a new small oil field in the northeastern portion of Ceram, one of the Molucca Islands in the Amboina residency. Actual operations are carried on by the Bataafsche Petroleum Co., a subsidiary of the Royal Dutch, although the titles of the several concessions are in the name of a holding company, the Boela Petroleum Maatschappij. Commercial production started in 1914 with a yield of 3,497 barrels, increasing to 354,400 barrels for 1921 (the

*Abstracts of the mining law of the Dutch East Indies, as quoted here, were taken from Senate Doucment No. 11, Sixty-seventh Congress, first session, and also from the corrected copy of the Report of the Federal Trade Commission on Foreign Ownership in the Petroleum Industry, dated Feb. 12, 1923.



Pumping Station of the Bataafsche Petroleum Company in Perlak (Atjeh), Sumatra

latest returns available). The Ceram crude yields a high-grade fuel oil, all of which is disposed of at Baela Bay, a fueling station located on this island.

Possible Fields and Estimated Reserve

There are several known but yet undeveloped oil-bearing areas in the Dutch East Indies. The larger of these is the Djambi field, located in the residency of the same name, in central Sumatra. There are a large number of "anticlines" already mapped in this district, and it is considered to be the most promising of future fields. An American and several Dutch companies negotiated with the colonial government over a period of several years concerning the granting of concessions in the Djambi area, but the question was not settled until late in 1921, when the final award was made to the Bataafsche Petroleum Maatschappij. The grant, amounting to 4,312,620 acres, is in the name of the Nederlandsch Indische Aardolie Maatschappij (Netherlands Indies Mineral Oil Co.), which has a capital of 10,000,000 guilders. This company has 10,000 shares, of which half are owned by the Dutch colonial government and the remainder are the property of the Bataafsche Petroleum Maatschappij, the operating company of the Royal Dutch. Uncertainty as to future taxation methods has retarded actual developments, but drilling on an extensive scale is expected soon.

Pipeline of the B. P. Co. in Perlak (Atjeh), Sumatra

Farther to the northeast is still another prospective petroleum area known as the Siak field. It lies along a river of the same name in the southeastern portion of the Oostkust residency of Sumatra. Very little of the geology of the section is known as yet, so its value as a future field is more or less speculative.

The colonial government, working through its "mining service," has been carrying on survey and exploration work in the Atjeh residency to the west and north of the present Perlak area, but conditions were found to be unfavorable. Other investigations of this nature were made to the south and east of the Atjeh field, with results that indicate the extension of the petroleum-bearing formation in that direction.

During 1922 a new field was discovered on Boenjoe, a small island near Tarakan and off the northeast coast of Borneo. The petroleum sands are believed to be a continuation of the extensive Tarakan field.

The geological formation of the Borneo coast opposite Tarakan, as well as the territory north of Samarinda, is believed to be favorable for the retention of petroleum in commercial quantities, but up to the present nothing has been done here beyond preliminary surveys.

Likely geological structures and even actual oil seepages are also known to exist in various parts of Java outside of the present producing areas, as well as in the other islands of the colony, such as Celebes, Boeroe, Timor, Sumbawa, and Western New Guinea. Most of these possible fields, especially those outside of Java, will probably not be developed for a number of years because of the remoteness of these places from centres of civilization, a tropical climate that is generally unhealthful for the white races, and the unwillingness on the part of the natives to hire out as laborers. This labor question does not exist in Java, as here there is a 35,000,000 population to draw upon and, furthermore, the Javanese will work. In the other islands of the archipelago the natives are not so numerous; besides, in Sumatra they are too well off or too proud to do coolie work, while in Borneo, Celebes, and New Guinea the scattered tribes are still very primitive and, generally speaking, avoid the white man and his ways. This difficulty of finding local labor in these outlying islands—which makes it necessary to import contract coolies from Java, China, or British India—is and will continue to be an important factor tending to delay for a number of years the development of many of the Dutch East Indian prospective fields.

Because of climatic conditions that are rather severe on the white race, and the thick, almost impenetrable tropical jungle that blankets most of the islands, the nature of the underlying strata is practically unknown, except in the present commercial fields and their immediate vicinity. This lack of geological knowledge based on comprehensive surveys makes a calculation of the possible petroleum reserve of these colonies a most difficult problem. Dr. David White of the United States geological survey believes that a total of 3.2 to 4 billions of barrels is a conservative estimate for the amount of petroleum still in the ground in the Dutch East Indies and Papua.

Producing Companies

There are two producing interests in the Dutch East Indies—the Koninklyke Nederlandsche Maatschappij tot Exploitatie van Petroleumbronnen in Nederlandsch-India (Royal Dutch Co.), including its various subsidiary companies, and the Nederlandsche Koloniale Petroleum Maatschappij, a subsidiary company of the Standard Oil Co. of New Jersey.

The Royal Dutch Co. was incorporated in the Netherlands in June, 1890, and in January, 1907, it united with the Shell Transport & Trading Co. (Ltd.), incorporated in England in October, 1897—forming what is known as the Royal Dutch-Shell group, a combination that controlled 11 per cent. of the world's petroleum production in 1921. At the time the above union took place two new companies were formed for the purpose of carrying on the business of the organization. They were the Anglo-Saxon Petroleum Co. (Ltd.), registered in England with £25,000,000 capital (which company takes care of the larger part of the shipping of oil to places outside of the Dutch East Indies), and the Bataafsche Petroleum Maatschappij, registered in the Netherlands with a capital of 300,000,000 guilders. The latter company carries on all production and refining in the colonies except in the island of Java. Sixty per cent. of the capital of both these companies is held by the Royal Dutch Co. and the remaining 40 per cent. is the share of the Shelf Co.

The Royal Dutch Co., working through the Bataafsche Petroleum Co., has practically complete control of the petroleum output in the Dutch colonies, producing 93.6 and 97.2 per cent. of the total, respectively, for the years 1920 and 1921, according to the report of the federal trade commission of foreign ownership in the petroleum industry, issued in February, 1923. The Bataafsche company not only operates fields in Borneo and Sumatra, but also works through several affiliated companies. The larger and more important of these is the Dordtsche Petroleum Maatschappij (capital 2,000,000 guilders), the control of which was secured in 1911. This subsidiary company carries on the Java production and acts as the selling agent throughout the Dutch East Indies. Another affiliation is the Nederlandsch Indische Tankboot Maatschappij, which company is the interisland distributer of crude and refined products throughout the colony. The companies, operating or owning concessions in Sumatra, directly or indirectly connected with the Royal Dutch and Bataafsche companies are the Moera Enim Petroleum Maatschappij, Periak Petroleum Maatschappij, Petroleum Maatschappij Zuid-Perlak, Petroleum Maatschappij Moesi-Ilir, Nederlandsch Indische Exploratie Maatschappij, Exploratie Maatschappij, Nederland, Maatschappij tot Mijn-, Bosch en Landbouw Exploitatie in Langkat, and the Nederlandsch Indische Aardolie Maatschappij.

The Bataafsche carries on all the actual work in Borneo, although the important concessions of the Koetei and Tarakan fields are in the name of the Royal Dutch Co., the Nederlandsch Indische Exploratie Maatschappij, or the Tarakan Petroleum Maatschappij. Conditions are similar in the island of Ceram, where the Boela Petroleum Maatschappij holds title to the concessions, although they are worked by the Bataafsche Co.

The principal American interest in the Dutch East Indies is the Nederlandsche Koloniale Petroleum Maatschappij, a subsidiary of the Standard Oil Co. of New Jersey, organized in the Netherlands in 1912. This company, generally referred to as the Koloniale, has several properties, the best known of which is the Talang Akar concession in the Palembang residency of Sumatra, which produced about 11,000 barrels in 1920 and approximately 10,500 barrels for the first nine months of 1921, the latest period for which actual returns are available.

Other producing leases of this company are the Petak and Tremboel holdings in the Rembang Residency of Java.

The Koloniale's total production is officially given as 30,694 barrels in 1918, 39,227 barrels in 1919, and 37,076 barrels in 1920.

Prospecting and Concession Regulations

The mining laws of the Dutch East Indies covering prospecting and the production of petroleum date back to an act of May 23, 1899, Official Gazette No. 124. This was amended by an act of September 26, 1910, Official Gazette No. 293, and still further amended by an act of July 20, 1918, Official Gazette No. 588.

The Dutch law is very specific in regard to those who are eligible to obtain prospecting licenses and title to concessions. Only Dutch nationals or inhabitants of the Netherlands or the Netherlands East Indies are able to secure such privileges.

The law applies to companies as well, and only firms domiciled in the Netherlands or the Netherlands East Indies, the majority control of which is in the hands of Dutch nationals or inhabitants of the Netherlands East Indies (the latter residing either in the Netherlands East Indies or in the Netherlands), are allowed prospecting or concession rights. Article 4 of the mining law reads as follows:

> (1) Only the following can hold prospecting licenses or mining concessions: (*a*) Netherlands nationals; (*b*) inhabitants of the Netherlands or of the Netherlands East Indies; (*c*) companies domiciled in the Netherlands or in the Netherlands East Indies, or which, in the case of limited companies, the single manager or director, or both, or if there are several managers or directors, the majority of such managers or directors, and in the case of private companies financed by a sleeping partner, the single active partner, or if there are two such, both, or if there are several such, the majority of them, are Netherlands nationals or inhabitants of the Netherlands East Indies (in the latter case residing in the Netherlands East Indies or in the Netherlands), with the proviso: That the persons or companies not domiciled in the Netherlands East Indies must be properly represented there; and that persons domiciled in the Netherlands East Indies, the representatives in the Netherlands East Indies of persons not domiciled there, and the resident managers or representatives in the Netherlands East Indies of companies domiciled there or in the Netherlands must have authority to stay in the district or districts in which the prospecting or mining is to take place.
>
> (2) Applicants for a prospecting license or a concession must take up their domicile for the duration of the prospecting license or concession or for all purposes connected therewith in the office of the administrative head of the district within which the territory covered by their prospecting license or concession is situated either wholly or partly.
>
> (3) At the death of the lawful holder of a prospecting license or mining concession the rights and obligations resulting therefrom shall pass to his assigns, provided that they comply with the requirements of the present article either immediately or within one year of the date upon which they legally enter into such rights and obligations. During that year the said rights and obligations may be transferred to other persons or companies provided that such persons or companies comply with the requirements of the present article with regard to prospecting licenses, due regard being had to the stipulation under Clause 7 of Article 7, and always subject to the sanction of the governor-general.

Previous to the amendment of July 20, 1918, Official Gazette No. 588, the discovery of a mineral entitled the finder to concession rights, provided that the prospecting had been done under license and in accordance with the various provisions of the mining law. The 1918 amendment divided the various minerals into two classes, designated as A. and B. No change was made in the law pertaining to Class A minerals, and the discovery of any of these entitled the finder to a concession provided other parts of the law were satisfied. Petroleum, as well as coal, asphalt, bitumens, mineral wax, and iodine, was placed in Class B. The mining law, as amended, specifically states that the discovery of a Class B mineral does not entitle the finder to a mining concession. Mineral deposits thus found are to be worked by the government or by companies working under contract to the government.

The Dutch mining law covering the above-mentioned points is as follows:

> ARTICLE 1. (1) In the Netherlands East Indies rights in land do not include the right of disposal over the following minerals, etc.:
>
> (*a*) Precious stones, graphite, platinum, osmium, iridium, gold, silver, mercury, bismuth, molybdena, tin, wolfram, lead, copper, zinc, cadmium, nickel, cobalt, chromium, iron, manganese, antimony, arsenic, and strontium, whether pure or in the form of ores, and also other minerals, etc., found in the same deposits as the above named and thus extracted together with them; minerals, etc., which may be of use owing to their percentage of sulphur or for the preparation of alum and vitrol; phosphates which serve as fertilizers, and saltpeter; rock salt and the salts occurring with it in the same deposits.
>
> (*b*) Anthractite and all kinds of hard and soft coal; petroleum, bitumen, mineral wax, and all other kinds of bituminous substances, either solid or liquid, and inflammable gases—the latter in so far as they are not of recent date (marsh gases); iodine and its combinations.
>
> (2) In case of doubt as to whether any particular mineral, etc., is one of those mentioned in the foregoing list, and in particular one of those coming under (*a*) or (*b*), the decision shall rest with the governor-general.
>
> (3) The right of prospecting for and extracting such minerals, etc., will be granted pursuant to the provisions of this law. * * *
>
> ARTICLE 28. * * * (2) (*a*) The discovery of one of the minerals, etc., specified sub (*b*) in Clause 1 of Article 1 shall not entitle the discoverer to a mining concession. Only the government, or persons or companies with whom contracts are entered into by the government in pursuance of the stipulations of Article 5a, shall have the right to mine such minerals, etc. In the absence of a special agreement the reward for such a discovery shall be determined in each case by the governor-general.

In accordance with Official Gazette No. 15, of February 22, 1921, the islands of Sumatra and Borneo were closed to private prospecting, this decree setting forth that these islands would be reserved for government exploitation. This same decree mentioned that after July 1, 1921, Dutch New Guinea would be open to application for prospecting licenses.

The colonial government carries on exploitation and development work through its own mining service or "Dienst van de Mynbouw," which consists of two bureaus or divisions, namely, (1) of exploitation, and (2) of concessions and licenses. During the last few years this service has made a number of surveys along the northeast coast of Sumatra from the Atjeh field to those in Palembang residency. As a result of this pioneering the Atjeh field has been rather definitely limited toward the northwest, but extended to the south and east, and the Djambi area has been shown to be the most important prospective field in the Indies. The petroleum formations along the eastern coast of Borneo, as well as on the small islands of Tarakan and Boenjoe, have been the subject of special study, and all the strip of coast from British North Borneo southward to Balikpapan is now known to be quite favorable for the natural storage of petroleum. At least one well-equipped expedition of the mining service was sent into the country known as the Bird's Head at the western extremity of New Guinea, but the meager reports available on this prospecting do not indicate that this region contains large commercial pools of petroleum.

After the mining service has located prospective petroleum fields in a closed territory, the government may undertake the actual development or it may contract with and grant a concession to the highest bidder for this work. Such concessions are generally made for a period up to 75 years. The mining law covering the disposal of these grants is as follows :

ARTICLE 5a. (1) The government shall have power to cause prospecting and mining to be carried on in places where such do not conflict with rights granted to prospectors or concessionaires.

(2) For this purpose the government shall have power either to undertake prospecting and mining work itself or to enter into agreements with persons or companies binding them to undertake the work of prospecting and/or mining: *Provided*, That such persons satisfy the requirements laid down under Clause 1 of Article 4 of this law.

(3) With the exception of agreements referring exclusively to the undertaking of prospecting work, such agreements shall not be concluded until authority to do so has been granted by law in each individual case.

(4) The enactment by which pieces of land or districts are reserved for prospecting or mining on the footing laid down in this article shall name the minerals, etc., which are to be the object of such prospecting or mining. * * *

ARTICLE 31. If, as the result of a research ordered by the government, a mineral deposit is discovered which is, in the judgment of the governor-general, suitable for exploitation, the governor-general shall, subject to the rights of third parties, fix the limits within which no concession for the extraction of such mineral or minerals, etc., shall be granted except upon public tender, without prejudice to the right of the government itself to undertake mining work within the said limits or, pursuant to the provisions of Article 5a, to enter into agreements with persons or companies whereby the latter bind themsalves to undertake the exploitation of the deposits. In special cases the requirement of open competition may be departed from on the strength of powers granted by a royal enactment.

ARTICLE 32. Article 31 shall apply to mineral deposits which, in the judgment of the governor-general, come under consideration for working but for working of which a concession cannot be claimed pursuant to this law, and which do not fall under the provisions of Clause 1 of the said article.

ARTICLE 33. (1) In the case of a concession being put up for public tender *it shall be allotted to the party offering the largest amount in cash, provided* that, in the judgment of the governor-general, there is no reason why such party should not be granted the concession.

(2) If the putting up of the concession for tender leads to no result, then, *provided that there is no reason to the contrary and that no concession has* been granted privately, the ground reserved pursuant to the provisions of Articles 31 and 32 shall be again thrown open for prospectors.

In open territory, as in Java, Madoera, and some of the smaller islands, private prospecting is allowed to individuals and companies, provided they meet the nationality requirements mentioned under Part 1 of Article 4. The procedure for obtaining prospecting licenses, their duration, renewal, and the various other regulations covering them, are definitely set down in the following abstracts from the colonial mining law :—

ARTICLE 7. (1) The right to prospect shall be conferred by a written government license, which shall not be granted until after the parties with direct rights in the land affected, or third parties interested in it, have been given an opportunity of defending their interests, and then only on condition that the licensee enters into an obligation to pay compensation in advance for the damage which will be caused by the prospecting work, or, if the amount thereof cannot be determined in advance, to give security for the payment of such compensation.

(2) Licenses of the nature referred to in the preceding clause shall be issued by the official appointed for that purpose by special enactment. The application for permission to prospect, in which the ground to be covered must be indicated as exactly as possible, must be in writing and shall be lodged in duplicate with the said official, who, after having noted upon both copies of the application the date and hour of its having been lodged, shall return one copy to the applicant.

(3) Applications shall be dealt with in order of priority.

(4) Licenses shall be granted for a definite period not exceeding three successive years in duration, and for a field of search extending to an indefinite depth within the vertical projection of a piece of ground indicated as exactly as possible in the license. A license may be prolonged twice, each time for not more than one year, if the holder of the license lodges an application to that effect before the expiration of the original term of the license and in the manner laid down in clause 2 of this article. Conditions may be attached to a license.

(5) There shall be a right of appeal to the governor-general against decisions given on applications for licenses or for prolongation thereof. The governor general shall have power to deviate for reasons of equity, or in the interest of the public, from the rule laid down in Clause 3 of this article.

(6) The prospecting work must be commenced within one year from the date upon which the license for same has been granted.

(7) For the transference of a license the sanction of the government must be obtained.

(8) Further regulations for the carrying into effect of this article, and also with regard to the maximum dimensions of pieces of land for which prospecting licenses may be applied for, will be laid down in a special enactment.

ATRICLE 8. (1) Prospecting shall not be permitted (*a*) in pieces of land or districts which have been reserved either for prospecting and mining work of the nature referred to in Article 5a or for the granting of a concession after public competition pursuant to Articles 31 and 32 ; and also in pieces of land for which concessions have been granted to other parties or with regard to which agreements of the nature referred to in Article 5a have been entered into with other parties, in so far as such prospecting has for its object the minerals, etc., to which the reservation, the concession, or the agreement refers ; (*b*) in pieces of land for prospecting within which a license has been granted to other parties, as long as the latter still have the right to claim a concession on the strength of that license ; (*c*) in pieces of land or district which have been closed to prospectors by the governor general in the public interest.

(2) Prospecting work shall not extend, within the field of search, to ground upon which fortifications or government or public buildings stand or in which churchyards, graves, public roads, canals, or railways are laid down nor to ground which the native customs cause to be regarded as consecrated ground or in which prospecting is forbidden in the public interest (as to which the governor-general shall judge) nor to within a certain distance, to be determined by special enactment, of the aforesaid ground or pieces of ground.

(3) Prospecting work shall also not extend to pieces of ground upon which dwelling houses or factories are situated nor to the ground surrounding such dwelling houses or factories at a distance from them to be determined by special enactment, unless the consent of the parties with direct rights in such ground or of third parties interested in it be first obtained.*

(To be continued.)

---

*Abstracts of the mining law of the Dutch East Indies, as quoted here, were taken from Senate Document No. 11, Sixty-seventh Congress, first session, and also from the corrected copy of the Report of the Federal Trade Commission on Foreign Ownership in the Petroleum Industry, dated Feb. 12, 1923.

Berloy Metal Lumber

The field of metal lumber is floor, partition and roof construction. It does not take the place of structural steel or reinforced concrete beams and columns. In smaller buildings, however, it can be used for the complete structure.

Metal lumber offers a construction which is not only fire-proof but also sound proof and insect proof. Its low dead load means easy transportation of a comparatively small quantity of materials of great efficiency. Erection can be carried on very rapidly without special equipment for specially trained workmen as the work is simply the well-known joist and stud construction combined with a fire-proof and wonderfully efficient material.

Metal lumber is splendidly adapted to use in countries subject to earthquake. With great strength and stiffness it combines a degree of elasticity not surpassed by any other construction and because of its adaptability, it can be used to brace and tie together the structure in which it is used, affording a big added factor of earthquake-resistance. Here again the moderate dead load is an advantage since it lessens the strain on supporting structure and the fire-proof qualities are a safe-guard against the sweeping fires which so often follow earthquakes.

Metal lumber is not a new or untried material. It has been used successfully in thousands of buildings in all parts of the United States over a period of many years. It has been used in buildings as high as fourteen stories and in many homes and other smaller structures.

The United States government used metal lumber in the 44 buildings which constitute the Schofield barracks at Honolulu, H. I. The Bethlehem Steel Co. used metal lumber for a complete mining village of 332 buildings in Chile, S. A. Metal lumber was used in the government observatory at Lima, Peru, and it has also been used extensively in many other buildings in Central and South America.

* * *

Of the two 12,000 k.w. generators of the Momoyama Power Plant of the Daido Electric Power Company (Daido Denryoku K. K.), one has been completed, and passed the inspection of the communications department on November 22, 1923. The transmission of the power to Osaka was commenced on November 24.

The Chinese Eastern Railway and Its Zone

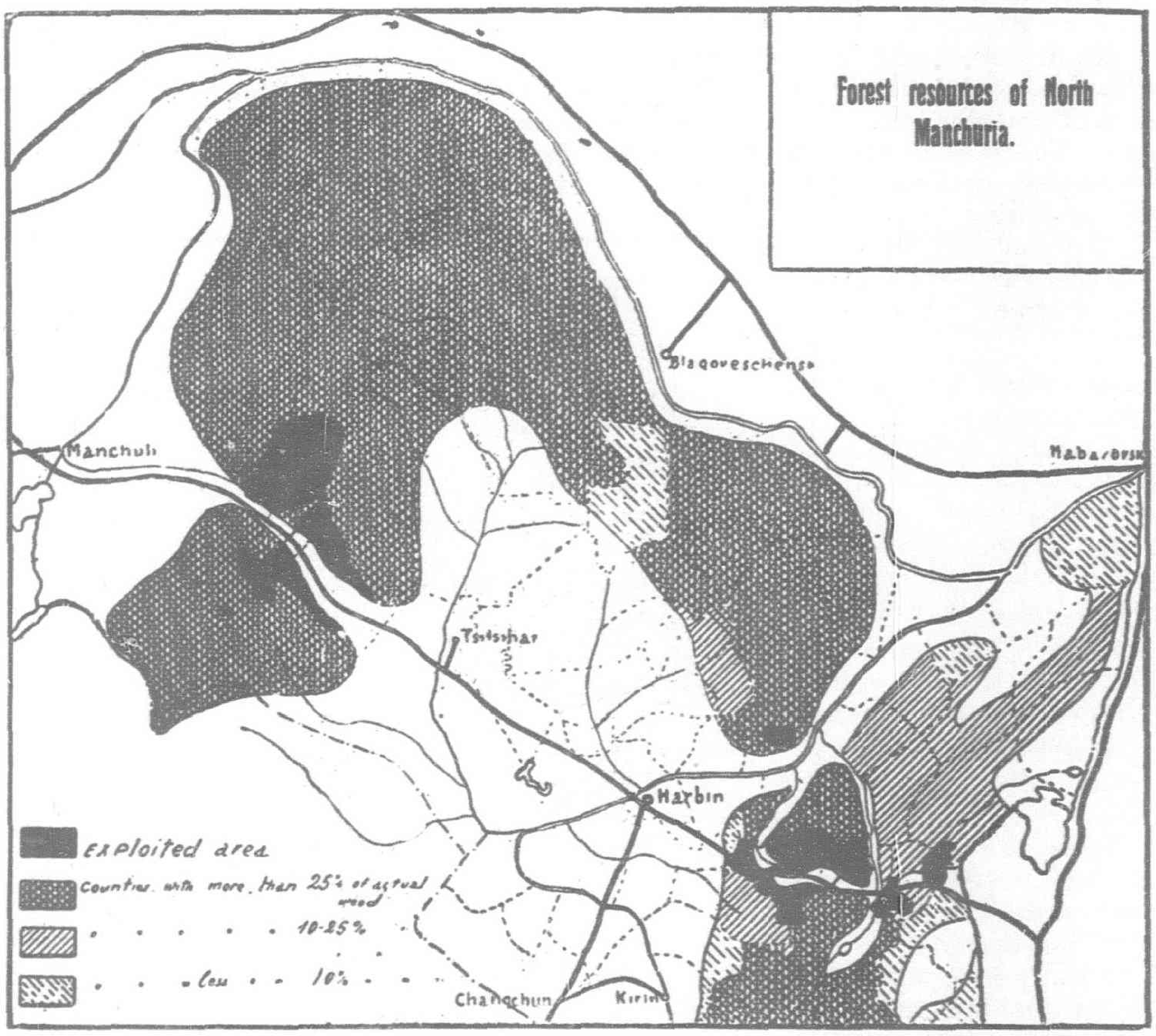
Forestry and Mining

ACCORDING to official sources the reserve stock of timber in North Manchuria is estimated at 136 billions of cubic feet. Out of this quantity only one thirty-fourth part (four billions) is actually exploited. In former days the whole territory of North Manchuria was comparable to "a Sea of trees." Proof hereof is contained in the name given to the country in the Tunghus dialect, wherein it is named "Votsi" the meaning of which is "Forests."

After the construction of the Chinese Eastern Railway and the enforced colonization of the country, forests were gradually logged, but only in districts in the vicinity of the railroad.

Actually the forests of North Manchuria assume the form of an enormous arch, extending from the confluent of the Shiks and Argun rivers to the southeast—towards the Sungari river, crossing the same in the area of the city of Sansing; and, maintaining their original direction in Kirin province, they merge with the woodlands of South Manchuria and Korea near the sources of the Sungari and Yalu rivers. The southwestern end of the arch is continued by a broad strip of forests, stretching through Barga southwards to the chain of the Great Khingan range.

The forests of both Heilungchiang and Kirin provinces possess enormous reserves of timber for building and for fuel purposes, which are estimated at 136 billion cubic feet. The most important forest districts, where logging is actually carried on, are the following—the eastern line of the Chinese Eastern Railway, the western, or Khingan zone, and the lower Sungari zone, lying at a distance of from 200 tp 300 kilometres from Harbin, down the course of the Sungari river.



The eastern forest zone is of the greatest importance in the local timber industry. It stretches along the railway line from Harbin to Pogranichnaia (Suifenho) between the stations of Hsiaolin and Silinkhe. The intense work of this eastern zone is caused by the richness of its most valuable tree species, which are the cedar, Ayan pine, nut-tree, velvet tree, lime tree, maple and others, and also by the nearness of the zone to the most important timber markets of Harbin and Changchun. The western (Khingan) zone is at a very great distance from these markets and abounds only in larch trees, yielding excellent material for special requirements, and in birches, which are used for fuel.

In the eastern zone there are situated the largest forest concessions of the Chinese Eastern Railway Company, and of the following timber merchants: Skidelsky, Kovalsky, Popoff, Shevchenko, Slinkin, and others. The concessions are equipped with railway feeder lines, they are well organized, and a few of them possess sawmills.

The most important concessions in the Khingan forest zone, stretching over a length of 300 kilometres from Niantsienshan station to Yakeshi station, are owned by Vorontsoff Bros. (Yakeshi), Shevchenko Bros. (Horgo and Irekte), Liu-ta-tsai (Puhetu) and Ma. This area produces fire-wood, larch wood sleepers, telegraph poles and supporting stanchions for mines.

From the lower Sungari zone less than 55,000 tons of products of the timber industry are brought to the railway, though as a whole the named zone supplies to woodless districts about 600,000 tons of timber, which is rafted on the Sungari river.

About 85 per cent. of fire-wood and timber building materials prepared at the concessions, were used in 1921 by the Chinese Eastern Railway for its own needs and only 15 per cent. were carried under commercial tariff rates for requirements of the local market and for export abroad.

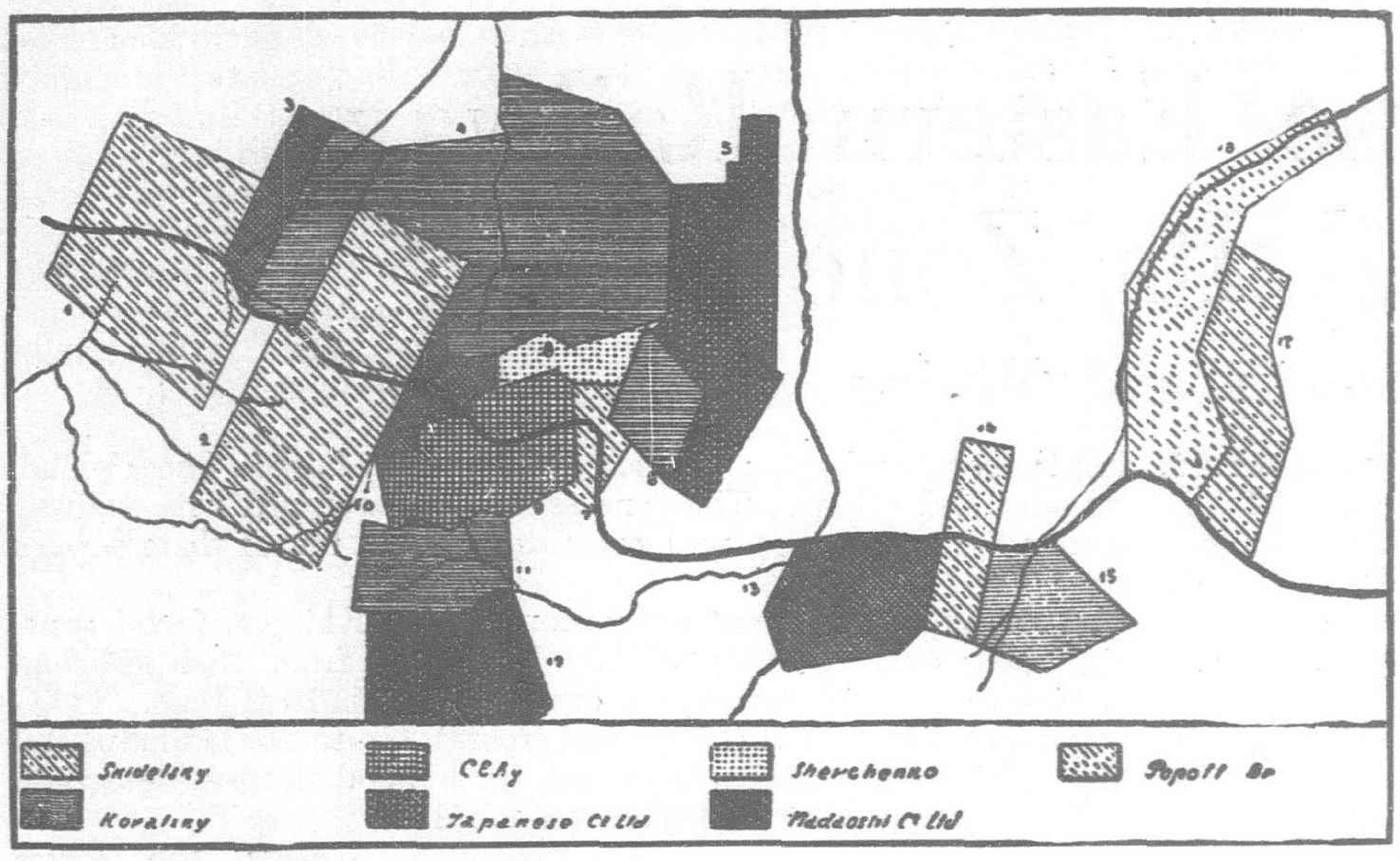
In 1922 already 37 per cent. were put upon the private market. Exports moved almost exclusively in the southern direction and amounted to 114,000 tons in 1922.

Manchurian timber has excellent opportunities for conquering foreign markets to a larger extent; however, in order to arrive at such result, it would be necessary to introduce a number of measures for improving timber industry in North Manchuria.

North Manchuria is very rich in mineral deposits: gold, various ores, natural soda, etc. However, so far only the output of coal, building stone and lime is of any industrial importance.

The total requirements of North Manchuria in coal during these last years amounted to about 500-600,000 tons, out of which quantity 500,000 tons were carried by the Chinese Eastern Railway. In the nearest future this consumption is liable to increase considerably.

In districts more accessible for logging operations in North Manchuria forests have been depleted and are moving away from the railway line, causing thereby a high price of fire-wood. For this reason the Chinese Eastern Railway has already started to replace wood-fuel by mineral fuel. 50 per cent. of the requirement of coal fuel are covered by local coal, almost exclusively of Chalainor origin, the remaining 50 per cent. are imported from abroad. The output of coal from the Chalainor mines numbers about 300,000 tons per annum on an average.



Map of the Eastern Concessions

Other coal deposits in North Manchuria have a very small output, viz., mines on the Hankhe river near the city of Mergen, and mines near Bukhai station of southern line. All these deposits yield only a low grade coal. The coal deposits at Matsiaokhe (100 kilometres from Matsiaokhe station) possessing an excellent coal, may have a very promising future. However, to work the same, it would be necessary first to obtain the concession required and to lay a feeder line over a stretch of 125 kilometres.

From outside markets 250-300,000 tons of coal are imported into North Manchuria. The bulk of these imports consists of South Manchurian Fuchun coal. The other kinds of coal, such as coal from Suchan, Karanor, Tchernoff and Tcheremkhovo, were imported from Russian territory in comparatively small numbers. Lately these imports have again begun to grow considerably.

Industry

Manufacturing industry in the country has by far not yet reached its due development. It is concentrated at the cities of Harbin and Fuchiatien, where all branches of industry existing in North Manchuria are represented, with the exception of wool-washing plants. The turnover of Harbin by far exceeds the turnover of all points on the railway line, taken together. The yearly turnover of industrial enterprises in North Manchuria of foreign (European) type is estimated at 25 million gold dollars.

Steam flour mills in the railway zone transform 300,000 tons of wheat.

The first place in manufacturing industry is taken by flour-milling. There exist in all 35 flour mills in the concession zone of the Chinese Eastern Railway, which mill up to 300,000 tons of wheat. 24 of these mills are situated in Harbin, and nine are at different points on the railway line. Besides flour, the local mills produce manna and buckwheat grits, they husk buckwheat and millet.

Out of the flour produced, about two-thirds are brought to the Chinese Eastern Railway and the remaining one-third is consumed directly at the points, where the mills are located, or is exported by river.

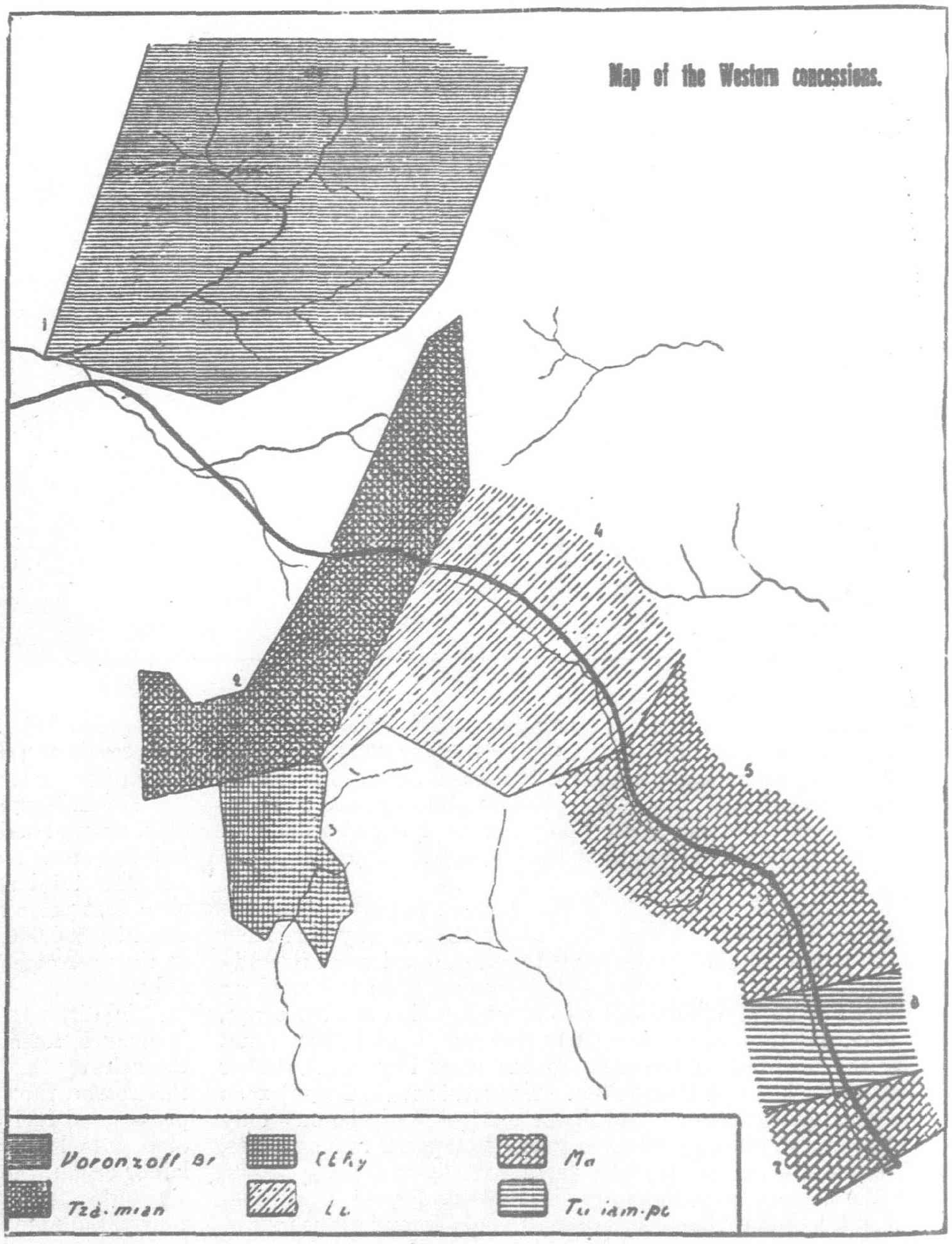
During the last year the oil-milling industry has largely developed in North Manchuria and is looking forward to a good future.

Oil-milling ranges second in importance among the branches of industry in North Manchuria. The country possesses more than 1,000 native mills and 56 steam mills, 45 of the latter are located at Harbin and the remaining ones are at various points of the railway line.

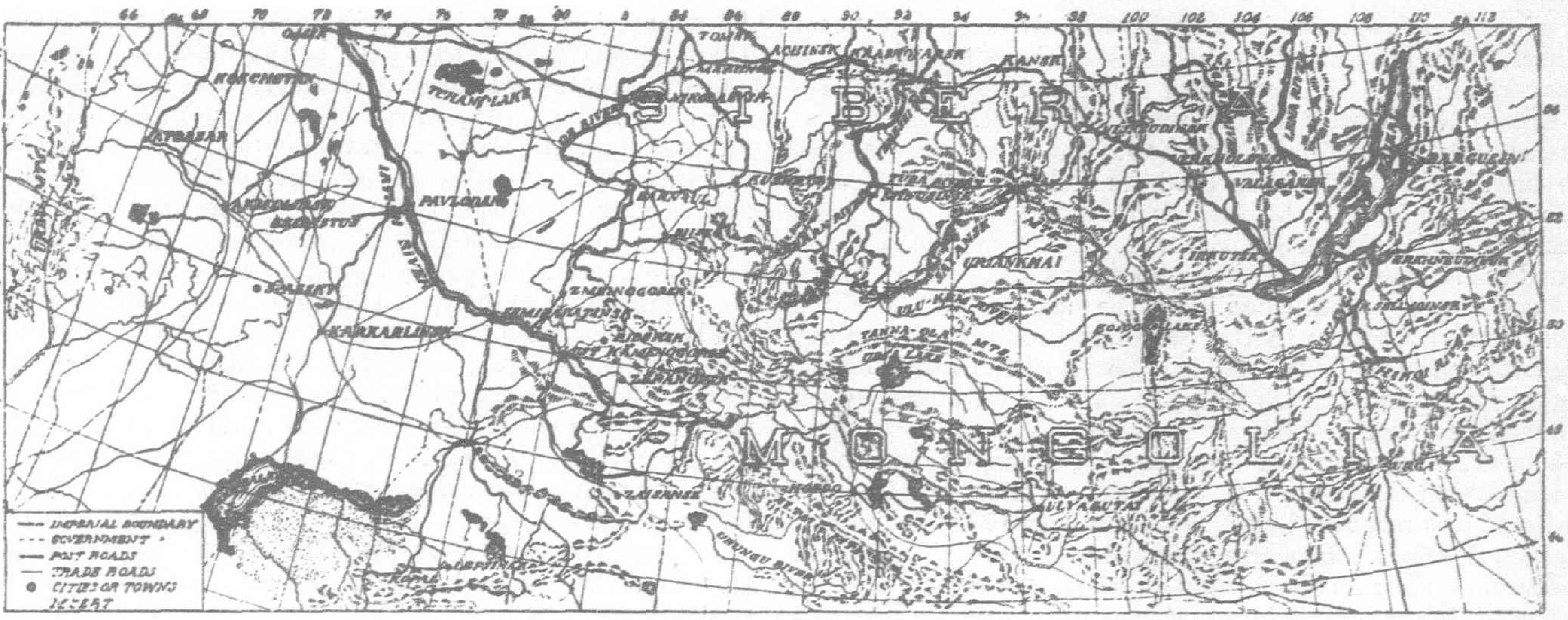
The value of the output from oil-mills equals about half of the value of products of flour mills. Bean-oil and bean-cakes are in great demand on both the interior and the foreign markets. Exports of bean-oil and bean-cakes are made partly to Europe and mostly to Japan. These products are not demanded in Russian territory, and for the Russian maritime province they have only the importance of providing export shipments to the Ussuri railway.

With the exception of the two above-named branehes of industry, all other kinds of manufacturing industry take only a modest place in the economical life of the country.

In the first place should be mentioned alcohol distilleries, which transform up to 120,000 tons of grain a year. Out of the seven existing distilleries only one is locatest outside of Harbin—at Fuliaerhti. Beat-sugar factories are at Ashiho and Harbin leather factories—at Hailar, Manchouli and two at Harbin. A number of other industries should be mentioned: soap-factories, candle factories, molsses-factories, macaroni-vermicelli factories, tallow-melting plants, etc.



Map of the Western concessions.



Western Siberia and the Altai Region

The Mineral Resources of the Altais

By Dr. Jacques K. Maguite

EDITORIAL NOTE:—*"In these mountains there lies an untold wealth of iron and copper and silver. Our explorers have reported that it is so. The iron mines of Lorraine are ours no longer and we must have iron. The Altai region is the richest mineral region in the world. Germans will go to that region in large numbers"; so said Dr. Jung, chief of the German government bureau of emigration, three years ago to Kenneth Roberts. The Germans knew what they were talking about. An expedition of their best engineers had made a two years survey of the region and submitted its report while the Moscow newspapers announced that a concession had been granted by the Soviet government to a German group headed by Hugo Stinnes which bore the title "The Development of the Mineral Wealth of Northern Altai."*

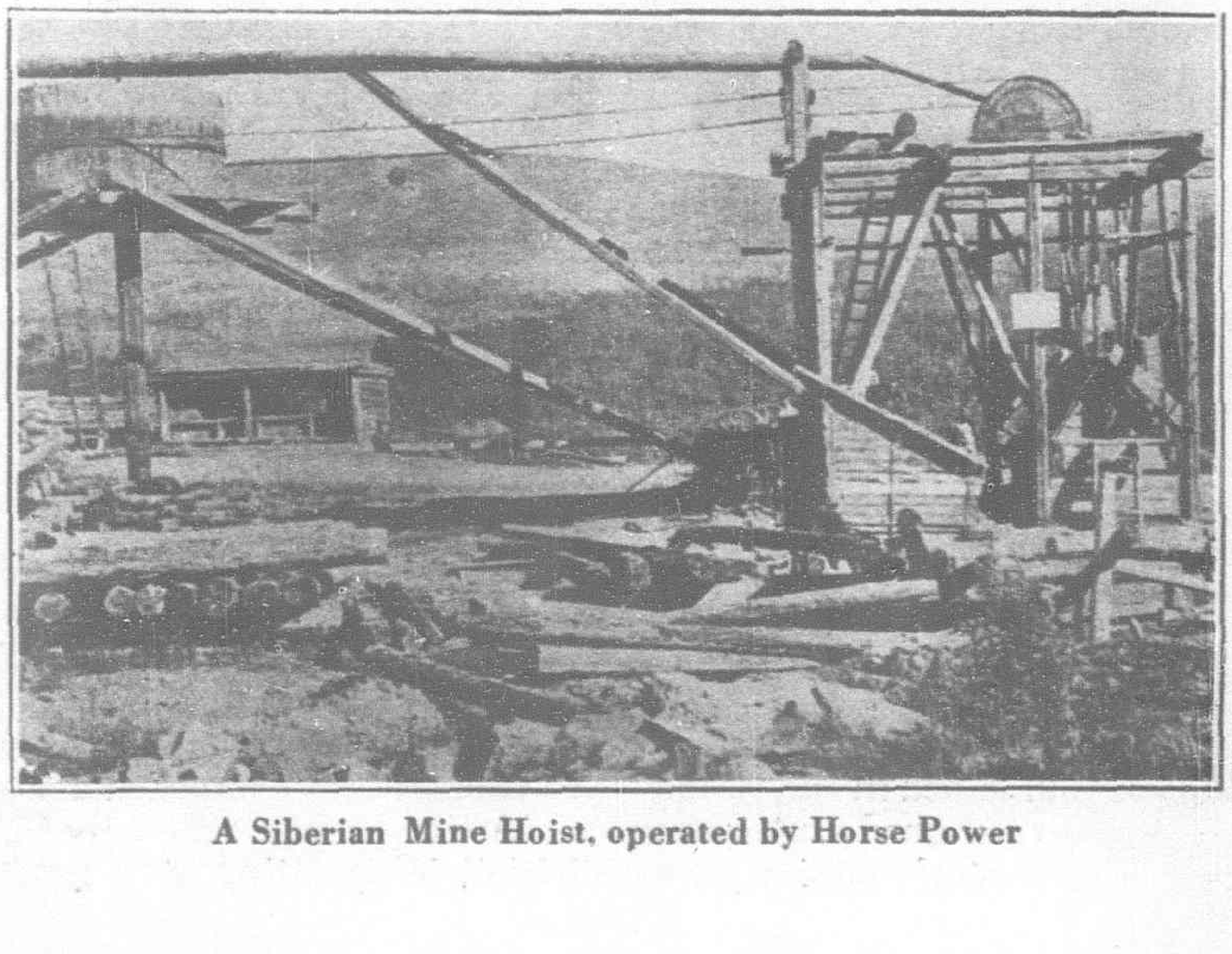
The Altai is undoubtedly one of the few remaining undeveloped regions of mineral wealth in the world. A large part of it lies in Mongolia, which, according to the principle laid down by the powers in the consortium agreement, is a most important part of the Chinese republic. China is powerless to assert her authority in this remote region, and there is little hope that the consortium powers will make any serious effort to give effect to their paper doctrine. The enormously rich Altai region will be absorbed by Russia. No power on earth can stop this, once transportation facilities make possible the opening up of the region. It requires only the improvement of navigation in the upper Yenesei and the construction of the Achinsck-Minusinsk and a few other branch railways to facilitate development of the Altai and the Uriankhai regions. Conditions in Russia are stabilizing. The trans-Siberian railway is getting slowly on its feet and in a few years we will be back to normalcy with the tide of emigration and the flow of capital setting towards the new elderado of Central Asia. The struggle for raw materials will be resumed on a larger scale than ever with every prospect of another clash over the control of this rich territory.

The following article is written by Dr. Jacques K. Maguite, a Russian engineer, who lived for many years in the Barnaul and Bishk districts and conducted a cattle business in the valleys of the western Altai.

* * *

The Altai mountain chain, situated between the 52° and 58° northern latitude and the 46° and 56° eastern longtitude, occupies the south-eastern part of the Altai and Tomsk provinces of eastern Siberia. The Altai district is a mountainous country of 500 versts in width with an area of 25,000 sq. versts. Altai is separated from Mongolia by the Sailugem range, and is itself composed of many mountain-chains. The highest of these is the Katunsko-Chuiskaya with several snow-capped peaks, among which is Beluha, 14,800-ft. above sea-level. On the slopes of these mountains are many glaciers, sources of great rivers like the R. Obi (Katun), while other streams are fed directly from the snow fields and mountain lakes. These streams flow along deep valleys, which sometimes widen into peopled steppes (Uimansakaya and Konskaya), sometimes narrow to dangerous gorges. The southern border of the Altai feeds the river Irtish. Here the most populated valley belongs to R. Buchtarm. The northern slopes of the Altai are covered with thick forests of fir-trees, in which, however, are found also foliated and cedar trees. Higher up are the rich mountain meadows where in the summer the nomads (inhabitants of Altai, Kirgizes and Telengites) live with their horses and cattle. These slopes are cultivated as high up as possible and are thickly inhabited by Russians who are quite prosperous, thanks to the natural wealth of the country.

In the northern part, the high Altais drop suddenly to a range hardly reaching the snow-line, called Kuznetzky Altai. On the wooded and marshy northern slopes of this range many streams are formed which feed the river Tom; the eastern slope feeding the Yenisei, the largest of whose tributaries is the Abukan.



A Siberian Mine Hoist, operated by Horse Power

On the Altai mountains we find besides the arid zones, the tundra, a little lower the pastures which in turn give way to zones of black fertile loam and desert.

On the south of Siberia and right up to the extreme east of the Altai region is found the remains of old mines belonging to pre-historic inhabitants, the unknown Chudi. These people mined silver and copper, as in those days the use of iron was as yet unknown. The tools found in some of these ancient mines served the Russians not only in uncovering the first workings in Siberia but even to-day, are often invaluable guides, in locating new mines. Thus, Peter the First having heard of silver on the shores of the Shilka and Arguna, sent Greek miners there, who, guided by the remains of these ancient workings, discovered in 1698 the location of silver and lead and in 1704 the well-known Nerchensky factory was established.

A little later also with the help of the old Chudi-workings, copper was discovered in the Altai and in 1726 the Kolivano-Boskresensky smelting works was founded by Akinfin Demidoff, who three years later opened a similar works in Barnaul. Silver and lead mines were opened in Zmeinogorsk by the same person and in 1744 silver-smelting works were established. In the same year Demidoff established several smelters in the Semipalatinsk district, on the boundary between Siberia and Altai. To meet the needs of the Altai mining enterprises the Irbinsky Iron Works were established in the Yenisei province in 1740.

Much later, gold mining was taken up, if we do not count the gold found with the silver. In some years quite a considerable amount of gold was recovered with the silver. In 1772 the amount reached about 1,800-lb. However, the presence of gold in Siberia had a destructive effect on the mining industry of Altai.

The chief hinderance to the growth of the mining-industry is the lack of transportation and the scarcity of labor. As it is, most of the population of the district is engaged in gold mining.

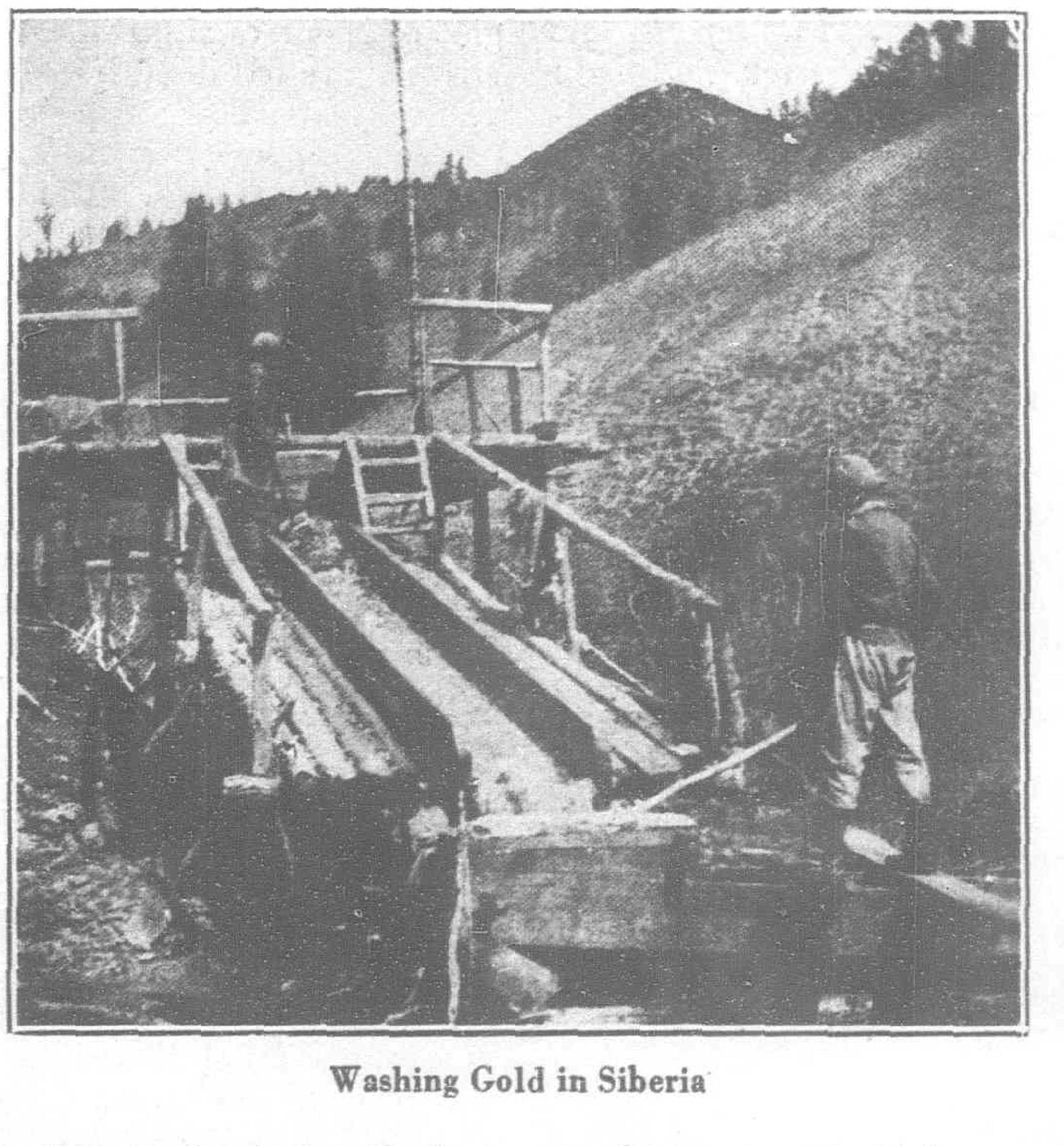
Gold Mining—The permission granted to several people in 1829 and 1831 to seek for gold gave rise to the discovery of gold between the rivers Tom and Yenisei.

The rocks in which gold is chiefly found is the so-called green stone (usually found in the shape of a horn of the kind known as: diorite, syenite and horn-shaped granite. On the eastern slopes of the Altais, lime-stone, sand-stone and clay is found; but following upwards these valleys, highly metamorphosed rocks, are found which have greatly changed their appearance and shape, especially in the vicinity of granite and diorite. The stratas where gold is found are usually near these horne stone granites and diorites.

Almost all the gold workings in the Altai region are located in the perpetual frozen soil districts. This frozen condition has preserved these mines in perfect condition, a wonderful geological study for mankind. Here we find traces of the stone-age inhabitants who have left their arrows, stone-hatchets, utensils, bones, etc.

In the years before the world war more gold was mined, however this is due more to the more intensive work on the old mines, the early coming of spring, rainy summers, the price of bread, transportation, etc.

In the southern part of the Altai, gold-mining is being slowly developed, chiefly on the China border, where the price of gold is high and labor is cheap; on an average 1,000 pickuls of ore yields from 6-8 and 13-15 dolias (one zolitnic=96 dolias=2.40 drams); in places, however, even 43-48 dolias are extracted from 1,000 pickuls. Favorable climatic conditions, abundance of water and the richness of the ore (sometimes the gold stratas is several dozens of feet thick) make gold mining very profitable in this district.



Washing Gold in Siberia

In the northern part of the Altai, in the Bisky and Kusnezky districts auriferous sands are chiefly found and only during the last ten years has ore been discovered.

Altai Mountain district.	1909 Outp. in poods	1909 devel. mines.	1910 Outp. G. in poods	1910 devel. mines.	1911 Outp. G. in poods	1911 devel. mines.	1912 Outp. G mines,	1912 devel. mines.
Zmeinochesky & Salaisky distr. ..	18.4	12	19.7	12	30.6	20	30.1	20
Chisky & Kuznezky distr. ..	13.2	8	14.1	9				
Total	31.6	20	33.9	21	30.6	20	31.1	20

1 pood=36.11-lb. avoirdupois.

The above table shows the amount of gold mined in the period 1909-1912 from which we see that the amount obtained during the last two years is decidedly less. However revised information gave 22 mines at work in 1913 with an output of 29.2 poods, evidence that the output since that year has considerably increased.

Those interested in gold mining have to invest large sums before even beginning work, since they must pay part of their wages in advance to the laborers, and provide stores, food, and working utensils, as transportation to these districts is possible only in summer by using the water-ways. The need of large quantities of bread and other food by the laborers, as also the supply of other household goods offers good profits to the local populace.

Thus only the mines of the Altai district embraced in the former lands of the Czar's cabinet produced in 1913 only 38 poods and 60 per cent. of this was taken from the Zirianovsky, Gavrilov, Zmesvekam and Ruddersk mines. On the first three, the gold was found with silver, on the Ruddersk 4 poods and 17-lb. were extracted from gold ore. The gold mined in these properties was smelted in their own laboratory, loaded on caravans and sent to the railway for delivery at Petrograd.

Silver and Lead Mining.—The silver-lead industry in Siberia and the Altai districts (Nerchsky) was operated chiefly by the Czar's cabinet, although private workings were found in the Kirgiz steppes (Semipalatnei district). Although the industry was not of great extent the annual production of silver and lead in Siberia was greater than that of the whole of Russia. The amount of these metals mined during the last few pre-war years is shown in the following figures (6 poods):—

	1909 Silver	1909 Lead	1910 Silver	1910 Lead	1911 Silver	1911 Lead	1912 Silver	1912 Lead	1912 Silver	1912 Lead
Altai District ..	1,304	13,306	1,362	38,610	1,190	22,376	1,004	39,188	634	37,218
Nercheskly Distr.	100	14,792	110	15,654	110	19,106	116	20,440	120	22,360
Kirgiz Steppe ..	220	21,672	144	29,386	192	7,758	76	28,348	188	21,152
Total in Siberia	1,624	49,770	1,616	83,650	1,492	49,330	1,196	87,976	942	80,730
Total in Russia	2,012	82,304	2,002	126,510	2,712	81,556	2,314	142,112	1,742	

The beginning of silver smelting dates back to 1742 in the Zmeigersky mine, from which in 1744-45 2 poods, 25¾-lb. of silver was obtained. After 1747, the management of these mines came under the imperial cabinet. At the present time, the entire Altai district is managed by the Russian government. Over 1,150 silver mines have been located in Altai, during recent years only eight have been worked. The upper strata of these mines are more or less pyrite, but at about 70-100 sagen (1 sagen—1.16 fathoms) downward the soil becomes ocherous. The pyrite soil is much poorer in metal than the ocherous soil and is also much more difficult to mine. The ocherous soil contains from ¾ to 10 zolotniks silver in one pood, and from 6 to 12-lb. of lead.

Silver is found in the Altai either in veins situated on the border between loam layers and porphyrous layers or right in the porphyrous rock, which originally gave rise to mining shafts.

On the whole, all the mines of Altai may be divided into two groups. To the first group belong those of the southern part known as the Smeinogorsk district. The other group is located in the Salaisky district located in the north-eastern part. The only difference between these two groups is that the mines in the Zmeinogorodsky district uses wood almost entirely for smelting while the Salaurisk group being situated near the coal fields employs coal.

The Altai district during many years produced annually about 4,000 poods of silver but on account of political conditions in Russia the output decreased after the outbreak of the war, forcing the people to abandon mining for agriculture. The rise in the cost of labor brought in its train a number of consequences and with it a blow to mining. This, added to the fact that the mines changed in character, from the rich, easily worked ocherous soil, to the poorer veins compelled a stoppage of operations.

At the present time only the Gavrilsky smelter in the Salairsk district, is operating at a profit due to an abundunce of silver, unusual facilities for mining and proximity to coal fields. With regard to the Zmeigorodsky district, the closing of smelters has not appreciably diminished the output as a chemical method of silver extraction is employed.

Copper Mining.—Copper mining in Siberia is insignificant and is chiefly carried on in the Altai district where there are several smelters under private management, some of which operate exclusively on copper ores and others obtain copper as a by-product of silver. The progress of the copper mining industry in pre-war years is shown in the following figures :—

	1909	1910	1911	1912	1913
From founderies.	pood	pood	pood	pood	pood
Altai district... ...	112,000	84,000	87,000	67,000	79,000
Kirgiz steppes ...	4,000	—	3,000	1,800	9,000
Total in Siberia ...	116,000	84,000	90,000	68,800	86,000

In the Altai, copper is obtained in conjunction with silver and also from shaft waters. From the latter during 1913, 10,000 poods of cement copper was obtained. At present, only the Suzunsk smelter is in action. The recovery of copper in this way can also be carried on in the Ziransky mines along with the mining of silver, and about 80,000 poods could be obtained.

New mines discovered in recent years cover an area of about 700 sq. versts. These hold out great prospects to the mining industry.

Graphite.—The recent discovery of valuable graphite deposits will assist in the future development of the Altai. The working of these mines under government supervision is at present under consideration by the officials of the mountain department.

Before the war the output of graphite mines in Russia was very insignificant. According to the figures given by an investigation committee the production was as follows :

1910-1912	None
1907-1909	3,300 poods
1913	300 ,,
1914	400 ,,

The domestic demand was supplied from abroad. Between 1911 and 1913, 226,000 poods valued at Roubles 395,000 was imported. The imports were clssified as follows :

Bricks	55 per cent.
Pencils, batteries, electrical uses	15 ,,
Mixtures for protection against heat ...	15 ,,
In steel factories	10 ,,
Graphite paint	5 ,,

The countries which supplied Russia were Germany (50 per cent.), Austria (24 per cent.), England (21 per cent.), Italy (3 per cent.), France (1 per cent.).

With regard to its graphite wealth the country has not even been scratched. The following information will indicate that the Altai alone could provide the graphite needed by the whole world.

The richest mines are in the Siberian Altai district where ancient graphite workings are found and in the Salarisk district on the Yenisei river. Graphite is also found in southern Ural and the Caucasus.

According to a report by German engineers the graphite deposits in the Salarisk district at the lowest estimate amounts to 20,000,000 poods, with a possible 100,000,000 poods. If we take into consideration that before the war the world consumption was 8 to 10 million poods it can be seen from the above figures that one small district can easily provide the whole world for 30 to 40 years with graphite.

Analysis of the Altai graphite shows :

Carbon	from 84.47	to 90.62	per cent.
Ash	,, 5.72	,, 14.3	,,
Volatile salts	,, 0.918	,, 2.981	,,
Moisture	,, 0.28	,, 0.45	,,

In its physical composition, the graphite of this district is amorgous and therefore can be utilized in all industries wherein graphite is at all necessary. So far, the graphite has been only used for experimental purposes and has shown fine results even in the production of bricks. Should further experiments reveal that the Altai graphite is unsuitable for the production of bricks, the deposits would supply 25 per cent. of the world's needs (which is 2,000,000 poods) since 75 per cent. is used in the production of bricks.

World Output of Graphite (in large tons)

	1913	1914	1915	1916	1917	1918	1919	1920	1921
1. Austria	48.6	37.4	34.4	46.5	46.3	44.0	47.4	—	—
2. Ceylon	28.9	14.2	21.8	33.4	26.1	15.2	6.6	—	—
graphite ...	10.9	10.9	6.0	8.0	11.9	11.4	7.5	—	—
3. Italy...	9.3	8.3	6.3	8.0	11.0	7.1	4.2	4.1	—
4. Korea	12.0	6.4	5.3	7.7	8.6	6.9	—	—	—
5. Bavaria	11.8	13.4	17.0	30.0	42.1	63.0	29.9	—	—
6. Indo-China	—	—	—	—	8.0	15.0	—	—	—
7. Madagascar ...	6.2	7.6	11.6	25.4	34.0	14.3	2.0	14.01	—
8. Mexico	4.3	4.1	4.1	0.4	0.4	6.0	3.9	—	—
9. U. S. A.	4.2	3.8	4.2	7.2	12.1	11.5	10.2	12.7	—
10. Canada	1.9	1.4	2.3	3.5	3.3	2.7	1.2	1.9	—
11. France	1.1	0.3	—	—	1.6	2.0	0.4	—	—
12. Spain	—	—	—	1.2	1.9	0.6	1.9	—	—
13. Russia	—	—	0.23	0.3	0.35	0.55	1.1	0.9	2.0
14. S. Africa	0.03	0.03	0.03	0.05	0.07	0.07	00.7	0.6	—
15. India	—	—	0.07	1.3	0.1	0.12	0.12	—	—

Taking into consideration the calculations of the investigators we find that in spite of transportation difficulties to the railway and other expenses the graphite could be delivered at a cost price of 37 to 44 rubles per ton f.o.b. to any foreign port. With regard to the world market of graphite the price rose enormously with beginning of the war, due to the fact that almost 40 per cent. of the world supply was obtained from Austria and Germany. Since 1918, the price has fallen considerably and still shows a decided downward tendency.

To sum up we find that the prospects of the graphite-industry in the Altai district are very bright. Therefore it is probable that in the new Soviet Russia this branch of industry will bring untold wealth into the country. It is even expected that in two or three years 50 to 80 thousand poods will be mined of which 30 to 40 thousand will be exported bringing in a sum of 50 to 600 thousand rubles.

Coal Mining.—The coal fields of Siberia begin on the border of the Kirghis steppes and extend to the shores of the Pacific. However this industry is very little developed, due on one side to the general lack of development in mining transportation, and other industries and on the other hand to the small demand for coal in regions where fire-wood is abundant. During the past 20 years, however, the forests have been largely cut down along the railroad so that the need of coal has become very acute. The richest coal fields are found in the so-called Kuznesky basin in the western Altai province. This area occupies the space between the Altai on the east and the Salairsky range on the west, covering a vast area of over 40,000 versts (0.66 mile). In the south-eastern corner of this valley near the village Kaltansk a number of enormous coal veins have been discovered, the most important of which is called the Kunersky located on the left bank of the Kinerky river a tributary of the Kondom, which has a thickness of 4 sagen (1 sagen—1.16 fathoms). The field is estimated to hold 30 million poods. There is also the Kirchiaksky vein 7 sagen in thickness ; 7 veins near the Kiriak lakes known as the lake veins, 2 sagen in thickness, estimated to contain 22 thousand poods. The Aralchinsky vein, 6 sagen in depth, contains 30,000,000 poods. The coal deposits near the village Kaltansk is estimated at 100 thousand million poods.

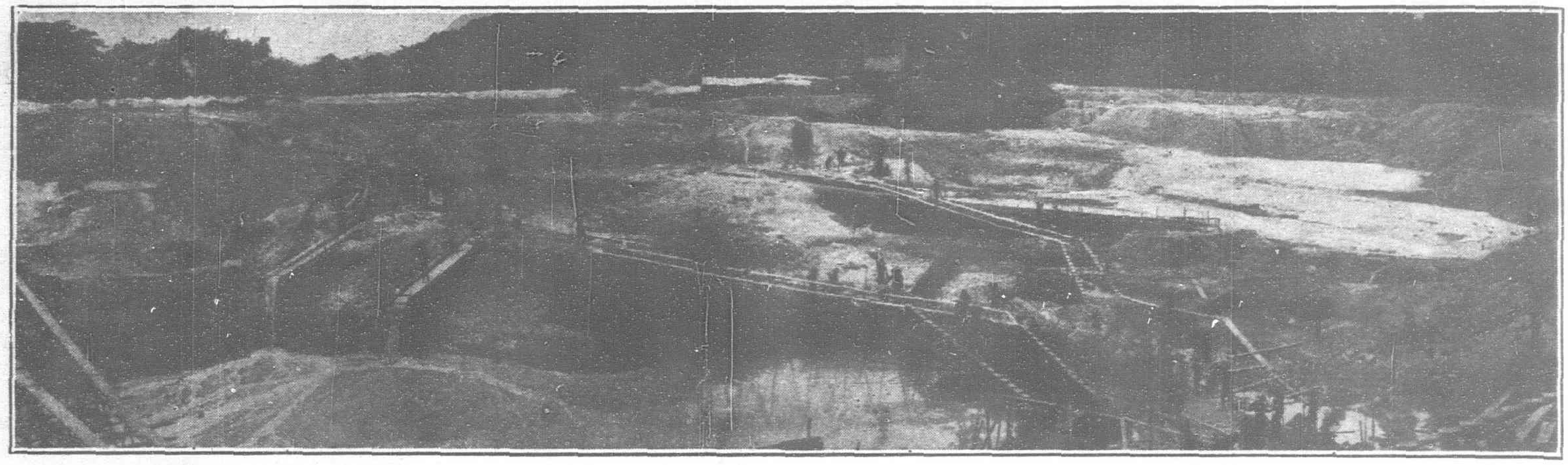
In the south-western part of the basin near the village Beresovka are found about 18 veins from 2½-ft. 5 sagen in depth with a store of 300,000,000 poods. Near the village Kostenskovo a sequence of 9 veins from 3-ft. 4½ sagens thick with a store of 50,000,000 poods has also been discovered. Many more coal seams reaching a thickness of 3 sagen have been discovered in the southern part of this basin, and also some near the town Kuznesk on the banks of the Tom river.

Not inferior in wealth is the northern part of the basin. Here we find the only mines at present under operation, known as the Bochatsky and Kolchuginsky. These even have their own railway branch. The Bochansk shaft is about 27 versts from the Gurievsk foundry. The thickness of the vein here is uneven, sometimes reaching 25 sagen, some of the coal makes good coke while other veins produce a high-grade smokeless coal.

Here also are fields belonging to the southern Kuznesky basin which are enormous in size. On the shores of the Ini river are also fields with veins of ½-1 sagen in depth. Here is also the Kulchusk shaft.

The coal deposits of the Kuznesk basin have not been accurately estimated and the above figures are only approximate. The calculations have been based on small areas and only on those veins which lie above the nearest river level. In the southern part, how-

(Continued on page 148.)



Open Cast Tin Mine at Puket, Siam

Tin Mining in Siam

By G. R. Oswald in The "Mining Journal."

CONSIDERABLE misapprehension almost universally exists as regards mining affairs in Siam, where complete ignorance is not the case, and it is the purpose of the writer to describe briefly such developments as have already taken place, the factors which have influenced their success or failure, the lines on which future enterprise should best be directed, and the vital question of titles and security of tenure.

Apart from the dredges, tin is produced from native ground sluices, opencasts, and from lode outcrops and detritus. It is unfortunate that no distinction is drawn in the Siamese statistics between alluvial and lode tin, but the proportion of the latter is extremely small. In 1907 the equivalent of 4,312 tons of metal was produced from these sources, rising to 8,999 in 1915, and declining to 7,083 last year. Dredge tin rose from *nil* in 1906 to 3,030 tons in 1921, and is still increasing.

A great impetus was given to the west coast provinces of Siam by the unqualified success of the first dredge installed at Tongkah harbor in 1906, and thenceforward these provinces were energetically prospected, being readily accessible from Penang, with the result that various companies embarked on dredging, with output in 1920 as follows:

	Tons metal.	
Tongkah harbor	... 615	Still working.
Tongkah compound	... —	Exhausted a small rich area on which Puket government offices formerly stood, and was then transferred to another area in Malaya.
Deebook ...	... —	Dredge transferred to Ronpibun, after several years' work on Deebook mine.
Bangnon valley	... —	Suspended operations in 1919.
Ratrut basin ...	... 182	Still working.
Renong tin ...	... 460	Still working.
Siamese tin ...	... 763	Still working.
Takuapa ...	... 282	Still working; East Asiatic Co.

Kundang tin was formed in 1920 to work land in Trang province, but went into liquidation the following year without result.

All the above are on the west coast, south from the Gulf of Kra, which washes the south end of Burma. On one of the Burmese Mergui Islands, the Austral-Malay company are about to put in a bucket dredge.

The only dredge in Siam away from the western provinces is at Ronpibun, in Nakon Sritamarat, and produces about 200 tons of metal yearly. This is the old Deebook dredge, which has been almost entirely rebuilt. A second dredge is being laid down at Ronpibun, and is stated to be of the suction cutter type.

The only failures have been where the ground was totally unsuited to dredging, and would not have happened had proper boring records been taken of the type of ground, and not merely the values entered.

Undeterred by the failure of the Kundang tin dredge, the Lampai Tin Mines, Ltd., are installing a suction cutter dredge in the Kantang district of Trang province.

The writer is of opinion that, in view of the careful way which the provinces on the western seaboard have been prospected, it is unlikely that any new areas suitable and large enough for bucket dredging will be there discovered, and that when the present mines are worked out the output will be limited to the spasmodic production of the native miners.

The tin provinces on the east coast of the peninsula are in somewhat better case. Since July 1918 there has been through rail communication between Malaya and Siam, and the eastern provinces of Patani (a Malay state ruled by Siam), Singora, Nakon Sritamarat, Surastr, and Langsuan have now begun to receive close attention from from prospectors.

Patani is the most northerly of the Malay states on the east coast, and the only one still under Siamese rule. At the western or upper end, in the Betawng district, is a group of mines worked by Penang companies by hydraulicing, and in some cases crushing lode detritus. None are of any importance. The ore is taken direct to Penang by road, passing through Kroh, in Upper Perak, thence through Kedah. A much larger quantity is shipped from the coast to Singapore from mines worked by natives nearer the coast. There have been reports of the discovery of ground suitable for dredging in this state, but those which so far have been investigated have been found useless for this purpose.

Singora province has been well searched, but so far no dredging areas have been located. The writer, however, has noted certain spots which he feels sure would be worth the expenditure required for proving them. Native mines which work alluvium during the wet season only, and one or two which work detrital material, account for the bulk of the production. Only one—Nam Noi mine—is owned by a European, and this is in an excellent situation alongside the railway. One distinct and rich tin lode has been located, and the owner, a Penang resident, was only prevented by the slump from getting the necessary plant. This mine, with reasonable capital expenditure, could be largely developed, and would form an excellent base for the discovery and acquisition of virgin areas in the neighborhood.

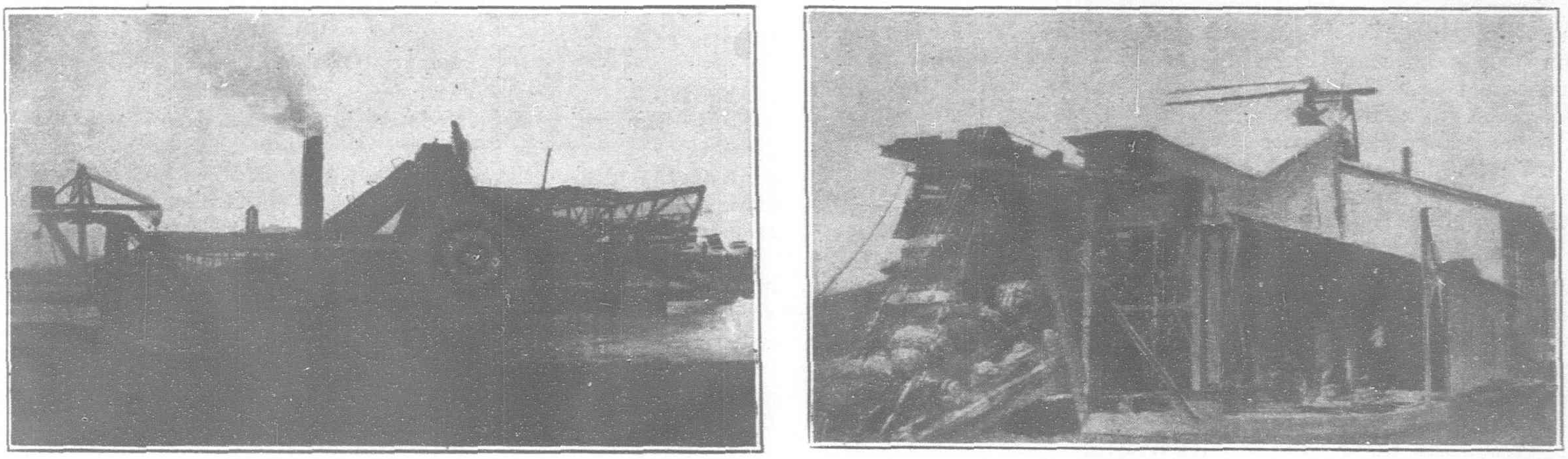
Nakon Sritamarat is by far the most promising of all the eastern provinces. At Ronpibun are several square miles of alluvium, part of which is being dredged, some hydrauliced by the Nawng Pet Mining Co., and other portions worked by natives. All the shallower rich patches have been "pock-marked" by former opencasts. In the sections worked by the two European companies the values are all deep, and are overlain by a thick bed of hard barren greenish clay. In both cases considerable power is wasted breaking this up, and as it contains little tin, this work is profitless. In addition to this, once slimed the clay never settles; many miles away from the dredge the streams are thick with slime. The Siamese authorities have recently, and rightly, determined to take a strong line about tailings, and difficulty is likely to be encountered by these companies on this account.

At Klong Chang, in Tungsong, the next county to Ronpibun, is a small hydraulic mine worked by a Penang company under French engineers.

There are several quite promising dredging areas in this province not yet taken up, though it is doubtful whether the large outputs of the west coast by this method will be equalled. The enormous cost of modern bucket dredges, rather than lack of suitable ground, is likely to curtail the development of this method in the future, and even the cheaper suction cutter dredges have their drawbacks.

The lode mines of Nakon offer great possibilities, and will be dealt with later.

Surastr, or Bandon province, to the north of Nakon, has hitherto produced tin from the country of Ban Na San only. Here one or two old-established mines were confirmed in their title when the first mining enactment was passed, twenty years ago, but the rest of the country, until a few months ago, was closed to mining. Many enthusiastic prospectors got a living for years from supporters in Malaya on the strength of their wonderful discoveries in Na San, and when their backers became restive and demanded to know when the mine was going to start paying its way, they would be told that no mining was at present allowed, but that the prohibition was likely to be removed soon, when "operations could start, and in the meantime, if the assets were not to be lost, further funds must be supplied" (to maintain the prospector).



Tin Dredges at Tong Kah Harbor, Puket, Siam

While the writer has no doubt that good ground exists in Na San, he is sceptical as to abnormal values being found; the district being now open to mining, developments should soon take place.

Koh Samui, an island off Bandon Bight, has for many years produced small quantities of tin, and nearly twenty years ago a Bangkok company laid down a small mill, but soon suspended operations.

Langsuan province, adjoining Surastr, to the north, beyond a few small ground-sluicing properties, has only one mine, now idle. This is owned by a Bangkok Chinese, and the pipe-line and monitors of the defunct Langsuan Mining Co. are utilized. This company was floated in Bangkok over twenty years ago and heavily capitalized, expensive buildings and plant were erected, a large staff engaged, while the vital factor of thoroughly proving the property beforehand was neglected. After a brief career the company suspended operations, and so disgusted the European residents of Bangkok that it would be difficult even now to float a public tin-mining company there.

Energetic recent prospecting, however, has been sufficiently successful to induce two companies—one American, the other Australian—to instal each a suction cutter dredge in Langsuan.

North again from Langsuan is the province of Chumporn, and, adjoining this, Ratburi. Small areas of tin have been worked from time to time for many years, and the provinces have been carefully explored, but it seems unlikely that any land suitable for a large mining company will be discovered.

Of all the east coast provinces, the writer considers Nakon Sritamarat to be the richest and the most likely to produce the largest output of tin over the longest period. Here we have what the Malay States almost completely lack—large numbers of lodes of convenient widths and high enough percentages to be capable of profitable operation. Usually only such lodes as contained wolfram only, or in which that mineral predominated, have been worked, the tin lodes being almost entirely neglected, and these mines are practically moribund now. Some have reached a depth of 100-ft. from the outcrop, and show diminution neither in width nor in values in depth. Practically all are in the mountains, and could be drained by adits for many years to come. The ore is usually patchy, but over many tons crushed uniform percentages are obtained. Out of every 100-lb. of quartz blasted out, the miner can usually at once discard 90-lb. as worthless; he picks out the large pieces from the remainder, and only needs to crush fine and wash about 5 per cent. of the quartz. The Chinese miners are very efficient at the extraction of the tin, but painfully slow at drilling, while on some of the mines the men spend half their time raising water. In spite of this, the cost per ton of rock mined is only 21s. By keeping the men on the work they really understand, the recovery of the tin, and paying them as at present so much per lb., and relieving them, by the installation of rock drills, of the drilling, and by a proper lay-out of the raising of water, even allowing for European overhead charges, metallic tin from these mines could be delivered in England at a cost of £100 per ton, including export duty, mine costs, freight, and all charges. As no mill would be required, and only rock drills, hoists, and ultimately, perhaps, pumps, little capital would be required for equipment.

As no development is ever done, options would be necessary to enable the holder to carry out sufficient drivages and pits to justify flotation. Some initial option money would need to be paid on signing, as the mineowners are very cautious in their dealings with Europeans.

Sufficient water-power is available to electrically operate all the mines in the neighborhood. Labor is plentiful and cheap, and free from strikes; there is ample fresh food, fish, fruit, and vegetables, available in the neighborhood of the mines, none of which are more than 20 miles from sea transport; and there are plenty of Siamese for building, jungle work, fossicking the dumps, etc.

There is certainly an excellent opening for a sound company to acquire and intensively exploit some of the existing mines, and gradually to obtain, by purchase or discovery, others. Working on these lines the capital for extensions would be derived from the mines themselves.

Sufficient labor could easily be obtained for such a company's operations, and, as in Malaya in the past, regular increasing immigration of Chinese would provide all the men required for progressive expansion.

ALLUVIAL MINING OTHER THAN DREDGING.—The west coast provinces, as already stated, have been so thoroughly prospected that little expansion can be expected there. The Penang companies operating in the Batawng district of Upper Patani have not been very successful of late, and if there were any other large rich areas there they would ere this have been discovered. Lower Patani, now rendered accessible by the Bangkok to Singapore railway, has been prospected fairly extensively, with disappointing results. Among others, the wealthy Anglo-Siam Corporation, of Bangkok and London, kept a highly-qualified engineer and staff in Patani for two years, but closed this branch of their business in 1921, which is significant.

In Singora there is nowhere a suitable water supply available for hydraulicing, except at a prohibitive distance from likely areas. There are quite a number of potential hydraulic mines in Nakon Sritamarat, which is the only east coast province in this position.

Climatic conditions are somewhat against the water supply in these provinces. In the Western Malay States, including the "wet season," rain falls to some extent probably on about 300 days in the year, usually at night (hence the success of rubber cultivation there), so that there is a constant supply of water at the hydraulic mines. In the east coast provinces of Siam there is a severe wet season, during part of which floods occur, from about the last week in October till the end of January. February, March, April, and the first half of May are dry and hot. From the latter part of May, and in June, July, and occasionally the first week in August, rain falls practically every afternoon, from 2 to 5 p.m. The rest of August, September, and the first part of October are very dry and hot. Hence, in equipping a hydraulic mine, it is best to put in much larger pipes than would be used in Malaya, so that the whole of the water available during the wet season can be utilized, and the work curtailed during the dry months.

Little attention had been paid to the tailings question by the authorities, but in 1919 a Bangkok firm started a gravel pump mine at Ronpibun, and, without any pretence at making a tailings area and dam, proceeded to dump their spoil directly into the river. The viceroy of the sourthern provinces was greatly incensed at this unwarrantable action, and the regulations are now being rigidly enforced. No hydraulic mining is now permitted within 44 yards of any stream, even a brook, which at any part of its course is used for public purposes, unless a heavy cash deposit is first made, which will be returned when the mine is exhausted, provided that no breach of the regulations has meantime been committed.

In view of the intermittence of the water supply and other points above noted, the writer is of opinion that, unless the bed to be worked carries values from near the surface down to bedrock, hydraulicing is unsuitable for Siam. Alluvial miners in the peninsula are often men of no technical training, and, expert though they no doubt are at their speciality, they are apt to scout new methods. It is surely better to adapt the plant to the mine than *vice versâ*. At the Newng Pei mine at Ronpibun, already mentioned, the hard clay is dropped by the monitor into the opencast, some 50-ft., where it has to be cut up by coolies with hoes before it can be slimed and raised over 70-ft. by the gravel pump. In such cases—and many are likely to recur in Siam—either underground mining should be adopted, or mechanical excavators used to remove the barren ground overlying the valuable alluvium. In the latter case the water-power will be doing profitable work all the time; in the former, coal-trained men would be necessary, but they could easily be obtained. Both these methods are new to the peninsula, but monitors and dredges were new also not so many years ago.

The writer has frequently heard vague statements that it is impossible for European companies to secure a footing in Siam, the authorities are antagonistic, etc. The history of the dredges already mentioned, showing that half the tin revenue is from these companies, is sufficient to disprove this. The Siamese government want to encourage foreign capital to enter the country, but they dislike the land, speculator, and intend to keep him out. Some disgruntled people whose cases have been investigated by the writer could only complain that the authorities refused to allow them to do things not permitted even to the native Siamese. Strict, though not arbitary, compliance with the law is insisted on, and in Siam, as elsewhere, tact and courtesy carry one a long way. Mining leases are perfectly sound titles, and when one is granted, there is no vexatious interference.

In brief, sound European companies entering Siam with a view to the acquisition and exploitation of tin mines, provided they employ competent engineers and not merely the cheaper untrained prospector, can rest assured of success, if they are content to conform to the law, and to adopt methods of mining which will not antagonize the authorities.

Mineral Resources of the Altais

(Continued from page 145.)

ever, the presence of 700,000,000 poods has been definitely located. It is said that in this district investigation is not necessary because coal is everywhere and it is only necessary to follow the outcrop.

The central Altai region is also rich in coal. Careful investigations have not been made, but coal is used as fuel everywhere.

The few private coal mining enterprises were stopped on account of the war, and only during this last year have feeble attempts been made to resume work.

To the above-mentioned wealth in the Altai plateau may be added the presence of precious stones, emeralds, topaz, amethysts, etc. Exact information about their location, however, is not available.

The Altai mining industry was under the management of Czar's cabinet before the war and very poorly equipped. Investigations were made only in those places favorably situated with regard to transportation. It came as a shock to the Russian public when the Soviet press in Moscow published a notice about the return of an expedition of German engineers from an investigation trip in the Altai, which had lasted two years. From private information it appears that this expedition was the result of an agreement made in 1921 between the Soviet government and a group of German manufacturers headed by Hugo Stinnes, under a concession which bears the name "The Developing of the Mineral Wealth of Northern Altai."

Rich Siberia Gold Belt

The Stanovoi gold belt of Siberia is heralded as "a potential discovery of far greater importance than any of the isolated Alaska or Klondike discoveries of the last century" by Chester Wells Purington, in a report to the American institute of mining and metallurgical engineers.

Since the receipt of this report, the result of several years of investigation, Purington lost his life in the Tokyo disaster in a vain attempt to save his two children after having rescued his wife.

Purington's report, based on exhaustive study of voluminous literature, maps and statistics, and many personal journeys and field inspection of various parts of Siberia, reaches the conclusions that "the area adjacent to the Stanovoi, Zhuged-Zhur and Yablonoi ranges is that which is accessible to the western world and will soonest give results from exploration."

The report after describing the history of the region, the beginnings of East Siberia mining, physical features and extent of the Stanovoi field, as well as other mineral deposits, asserts the existence of untouched stores of gold, saying:

"The Okotsk-Ulya region at seaboard constitutes a distinctly new discovery of alluvial gold which has every indication of containing a great commercial reserve. The well defined limit of the Okotsk sea gold field make it comparitively easy to conduct further exploration. Horse Bay is a definite limit of the field on the east and the mouth of Ylya in the south. In the streams tributary to Horse Bay not a colon of gold can be panned nor is there any magnetic concentrate. In the river Inys, only 15 miles to the west, gold is found of the same character as that in the rivers further west.

"Coming to the south limit, in the rivers to the south of Ulya and Ottay, signs of gold are far less prominent, although they exist for another 300 miles south to the Amur.

"This field itself is but the edge of what we have named the Stanovoi gold belt or area, scattered portions of which have already added $600,000,000 to the world's store of gold, and the major part of which is entirely unknown outside of Russian literature and professional circles.

"The development of aircraft, the increase of commercial shipping on the Pacific ocean, the better charting of remote seas, and altogether the increased ability of engineers and navigators to deal with rigorous sub-arctic conditions, will in the course of a very few years make the zone of the Stanovoi one of the accepted fields of economic exploitation, although the vastness of the distances will enforce the construction of roads from the ocean through the mountain passes to the interior."

Japan's Chemical Industry

Detailed Account of Earthquake Damage to Sulphuric Acid Plants

THE Japan Artificial Fertiliser Company has many factories throughout the country, those located in the earthquake area being at Oji, Kamayabori, Komatsugawa, Kinoshitagawa, Koyasu, and Yokohama. At the Oji factory one-tenth of the sulphuric acid plant was destroyed, and one-quarter of the electrolysis plant. Entire reconstruction of the factory will need six months. There are ample stocks of fertiliser on hand. The factory at Kamayabori was demolished by the earthquake and gutted by fire, but it is expected that 70 per cent. of the stocks of fertiliser are commercially saleable. At the Komatsugawa works three of the retorts (?) for making sulphuric acid collapsed and the roof fell in. It is hoped that reconstruction will be completed in two or three months. The amount of damage at the Kinoshitagawa works was comparatively small. The works at Koyasu and Yokohama were burnt to the ground, but at the latter the phosphorite and another storehouse as well as the office and factory remain. The total losses occasioned by the earthquake amount to 4,650,000 yen.

The Tokyo Sulphuric Acid Company manufactures concentrated and fuming sulphuric acid by synthetic processes. The damage sustained is almost nil, and given a supply of motive power operations can be resumed immediately. About a month's supply of raw material is in stock.

General Chemicals

The Asahi Electric Industries are manufacturers of bleaching powder, caustic soda, solidified oils, hydrochloric acid, soap, etc. Damage is slight. A boiler-room and one shed partly collapsed, and a quantity of manufactured salt was washed away. It is anticipated that there will be no reduction in output. The Kameido works of the Japan Chemical Manufacturing Company which manufactures barium sulphate, iodides, cosmetics, fertilisers, etc., suffered little damage other than the collapse of one building, a brick chimney, and a water tank.

The Iriye Chemical Manufacturing Company possesses a factory at Sendagaya, Tokyo, and manufactures acids, brewing materials, ethyls, etc. No damage other than collapse of a store. There is a shortage of certain raw materials and an entire lack of stocks. Repairs necessary to a portion of the works of the Imperial Alloy Refinery, which collapsed, will have no serious effect on the factory's activities, and it is proposed to resume work as soon as there is a demand. As regards raw materials there is a shortage of ferro-silicon. In the case of the Mukojima (Tokyo) Plating Co., who are makers of zinc plates, the damage is slight. There is a shortage of ammonium chloride, but work can be resumed on receipt of supplies.

At the Central Rubber Company's Honjo works there was damage to boilers and chimneys. Owing to complete lack of materials like calcium carbonate, litharge, carbon black, sulphur, petrol, grease, machine oil, etc., it is impossible to resume for the present. At the Fujikura Company's Osakicho works, where waterproof cloth, and aeroplane dope are manufactured, in addition to the destruction by fire of the laboratory, part of the works were damaged, but when motive power becomes available it will be possible to resume without a decrease in output. Part of the drying-room at the Sasazuke factory of the Japan High-class Paint Company collapsed, and some raw and manufactured materials were lost; but general damage was small. Two or three months are necessary for repairs, but work is not interfered with, and the middle of October should see a resumption of activity.

The Taisho Turpentine Company at Shinagawa, manufacture turpentine and preservative chemicals. Laboratories were demolished, and no stocks of raw materials or manufactured goods are on hand. Resumption is not yet decided upon. At the Taktae factory of the Japan Printing Ink Company, offices and sheds were burned. A stock of one month's supply of raw material is available.

Matches, Scientific Instruments and Glass

At the Maruyama Match Factory at Shirokane (Tokyo) no damage was sustained other than that to part of the pans, and work can be resumed immediately raw materials are received. There were four factories in Tokyo, three of which were gutted by fire, leaving only the one at Shirokane. No stocks exist. The Takachiho works at Hatagaya manufacture microscopes, microscopic slides, spectroscopes, etc. There has been practically no damage, and the factory's activities can readily be resumed. The greater part of the Asahi Glass Co.'s Tsurumi factory suffered severe damage and will have to be entirely rebuilt. Reconstruction will take from six months to a year. The Tachibana Glass Company (Shinagawa) are manufacturers of table ware, glass for electric lamps, etc. Damage is slight and early resumption probable. There is, however, a shortage of soda ash.

Losses to Cement Industry

The Fukagawa works of the Asano Cement Company were utterly destroyed by fire. One-third of the Kawasaki works was damaged. Reconstruction of the former will take one year and of the latter three months. The capacity of the Fukagawa works was 60,000 barrels per month and of the Kawasaki works 150,000 barrels, but in a few months a capacity of 100,000 barrels should be developed by new equipment at the Tsurumi works. The stocks at both factories cannot be used. The company has also factories at Moji with a capacity of 220,000 barrels, in Hokkaido 120,000 barrels, and in Formosa 60,000 barrels. The Hokkaido factory is to be enlarged in the near future so as to have a capacity of 220,000 barrels. It is anticipated that the total capacity will then be 710,000 barrels and there is no fear of shortage.

Shortage of Cylinders at Oxygen Factories

The Oshima Clay factory of the Tokyo Gas Company manufactures benzol, toluol, creosote, sulphate of ammonia, naphthalene, etc. Little damage was suffered and early resumption is anticipated.

At the Osaki factory of the Oriental Oxygen Manufacturing Company there was no damage to buildings or machinery, but there was a great loss of cylinders, and about 700 pumps were destroyed by fire. Every effort is being made for speedy reconstruction with no diminution of ouput. The Tanabe Oxygen Manufacturing Company's factory at Oshima was not damaged, but a large number of cylinders were lost. With regard to the Japan Oxygen Manufacturing Company's factories at Osaki and Kameido, there was practically no damage at the former and there is a possibility of early restoration, but at the Kameido factory wooden sheds were destroyed and 1,200 cylinders were lost. As soon as motive power is available work can be restarted, but in view of the shortage of containers there must be a decreased output.

"Hakusan Maru"—New N.Y.K. European Liner

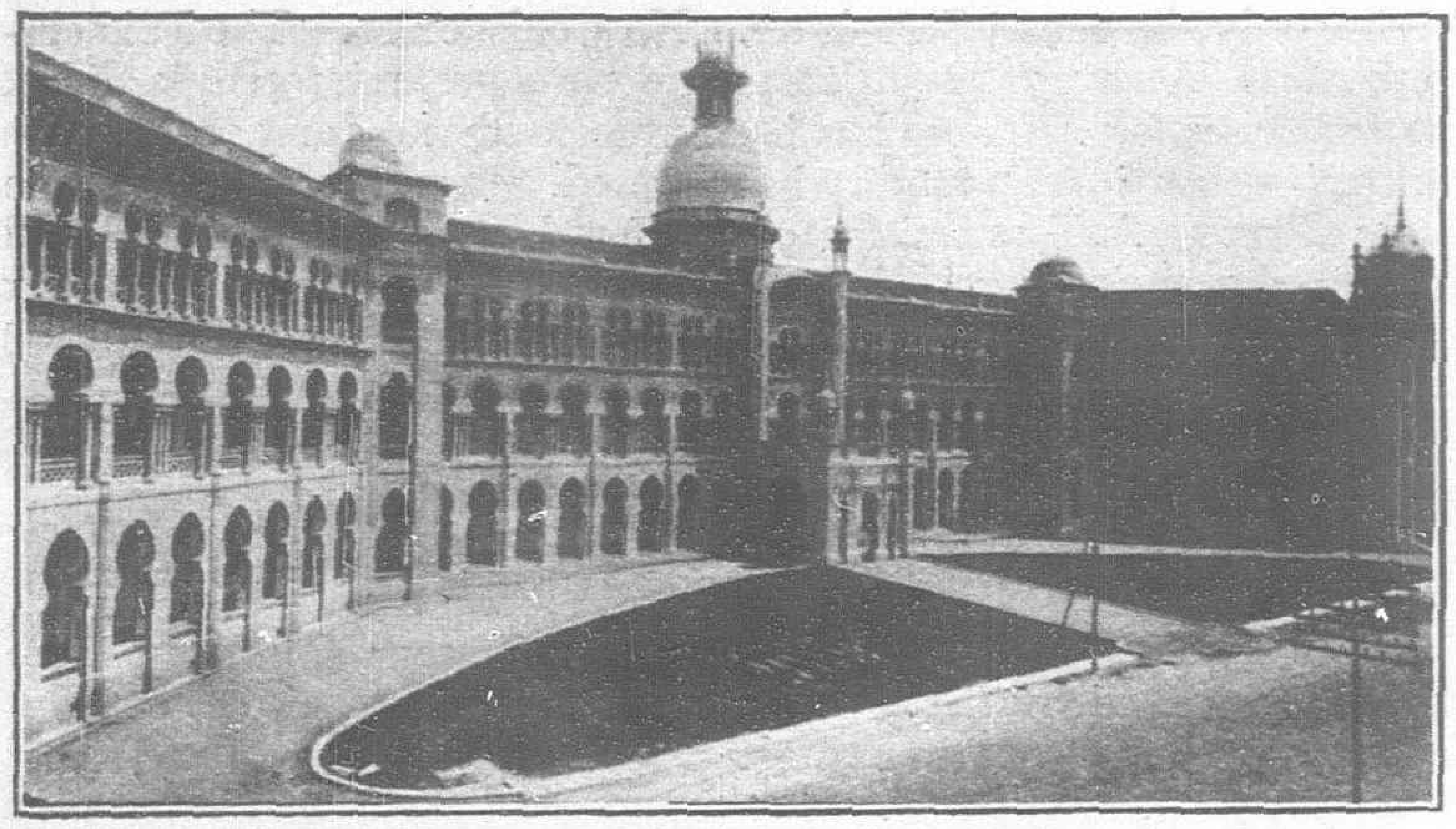
A NOTABLE improvement was made on the N. Y. K. Japan-Europe line, when the new liner *Hakusan Maru* was put on the service replacing the smaller s.s. *Kitano Maru*.

The *Hakusan Maru*, built at the Mitsu-Bishi Dockyard and Engine Works at Nagasaki, is the fourth of the " H " class passenger liners and is a sistership to the *Hakone Maru*, *Haruna Maru* and *Hakozaki Maru* already on the line. She is 515 feet long, 62 feet wide, 37 feet deep and of 10,423 tons gross and 18,850 displacement. Her propelling machinery consists of two sets of Parson's turbines of the latest type with double reduction gear, which enables her to maintain a speed of 16 knots.

The ship can carry 116 first class, 55 second class, 32 intermediate class and 102 third class passengers. The *Hakusan Maru* is installed with every modern convenience and comfort. The first class public rooms include a large dining saloon, a spacious lounge and music room, a writing room, a comfortable smoking room, and a children's room.

They are all conveniently located and neatly furnished. The verandah café, which occupies a most commanding position abaft, is one of the many attractive features. Great care has been used in designing and constructing the second and third class quarters which are remarkable for the provision of spacious room, efficient ventilation and lighting and complete sanitary arrangement.

In addition to being a superb passenger liner, the steamer has excellent facilities for handling cargo. Her loading capacity is 11,200 tons' deadweight and 13,000 tons' measurement, the *Hakusan Maru* is the first and the only liner in Japan to have a gyro compass installed.

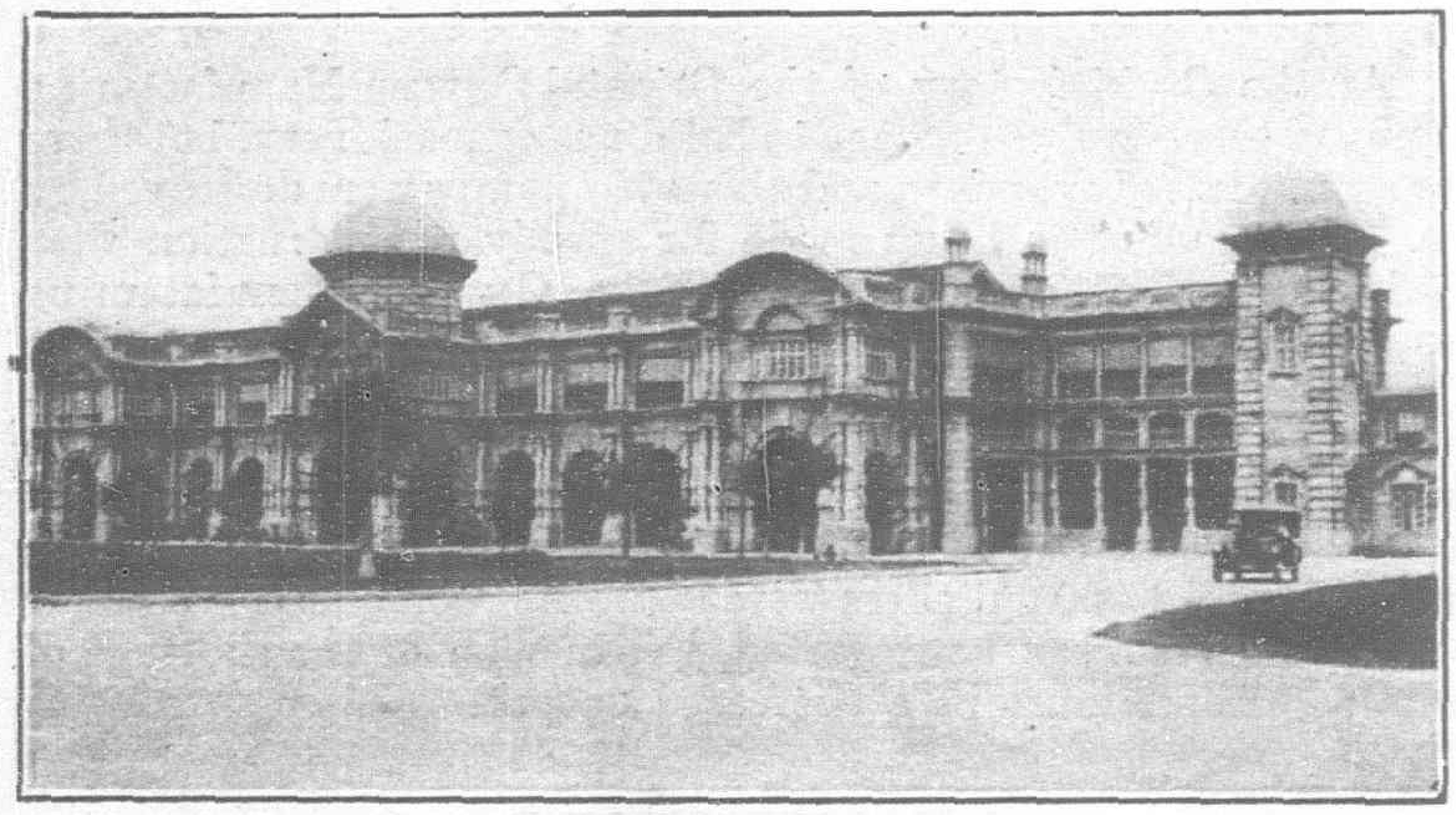


F.M.S.R. Head Offices at Kuala Lumpur

Architecture on the F.M.S. Railways

CONSIDERABLE development has taken place in recent years in the provision of modern station buildings, administrative offices and hotels on the Federated Malay States Railways, and the following notes and accompanying photographs are descriptive of the more important buildings :—

Ipoh Station and Hotel.—This station has three platforms with umbrella covering. The station offices and the hotel building are combined, the greater part of the ground floor of the combined building being taken up by station accommodation. The style of the building is free renaissance with centre dome and two flanking towers, built partly in brickwork and partly in concrete blockwork, with concrete columns, mouldings and balustrades, finished in cement rendering lined up as stone work. There is a dining room on the platform floor with seating accommodation for 90. On the upper floor there are 17 double bedrooms with private verandahs, also three sitting rooms. Water-borne sewage disposal discharged into septic tank. Electric lift to all floors. Commenced in 1913 and finished in 1916.



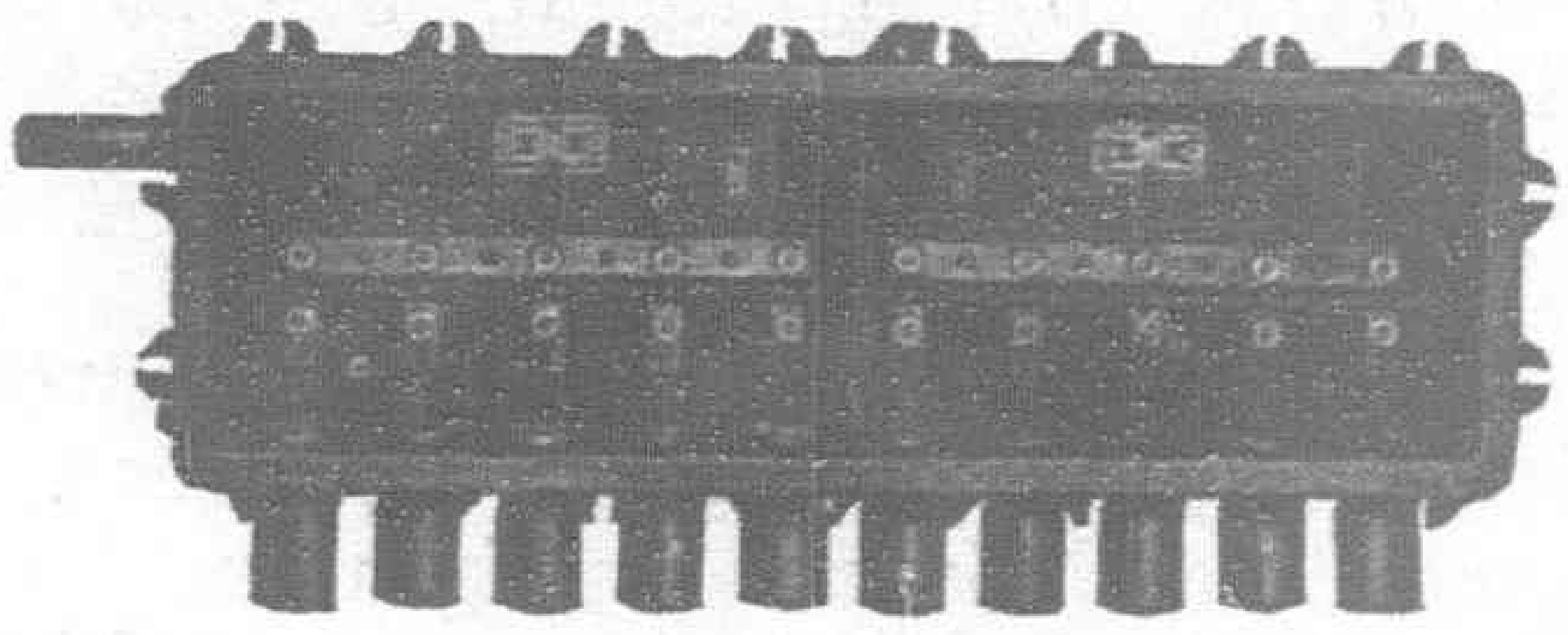
Ipoh Station and Hotel

Kuala Lumpur Station and Hotel.—Four platforms are provided under a continuous roof ; the station offices and the shipbuilding are combined, the greater part of the ground floor of the building being taken up by station accommodation. The site of the combined building is free benzantine built in brick work plaster mouldings and cast concrete columns and balustrade. Thirty double bedrooms are provided together with a large dining room with accommodation for 90, and three large lounges. Electric lift to all floors. Commenced in 1908 and finished in 1912.

Kuala Lumpur Station and Hotel

Central Railway Offices, Kuala Lumpur.—In this building are housed the chief executive and administrative officers of the Federated Malay States Railways. The style is free benzantine, built with cast concrete columns, mouldings and balustrades and finished with cement rendering lined up as stone work. Electric lift to all floors. Commenced in 1914, finished in 1918.

Plans are now being prepared for a new terminal station in Singapore, new district railway offices in Kuala Lumpur and for annexes to the Kuala Lumpur and Ipoh station hotels.



TYPE B-54, 5-WAY, 2-WIRE, 250-VOLT JUNCTION BOX

STANDARD Cable Accessories

(Junction Boxes, Cable Terminals, Insulating Materials, etc.)

promote the economical installation, operation, and maintainance of electric transmission systems. When used with STANDARD Cables they insure maximum operating efficiency.

Standard Underground Cable Co.

General Offices: Pittsburgh, Pa., U.S.A.

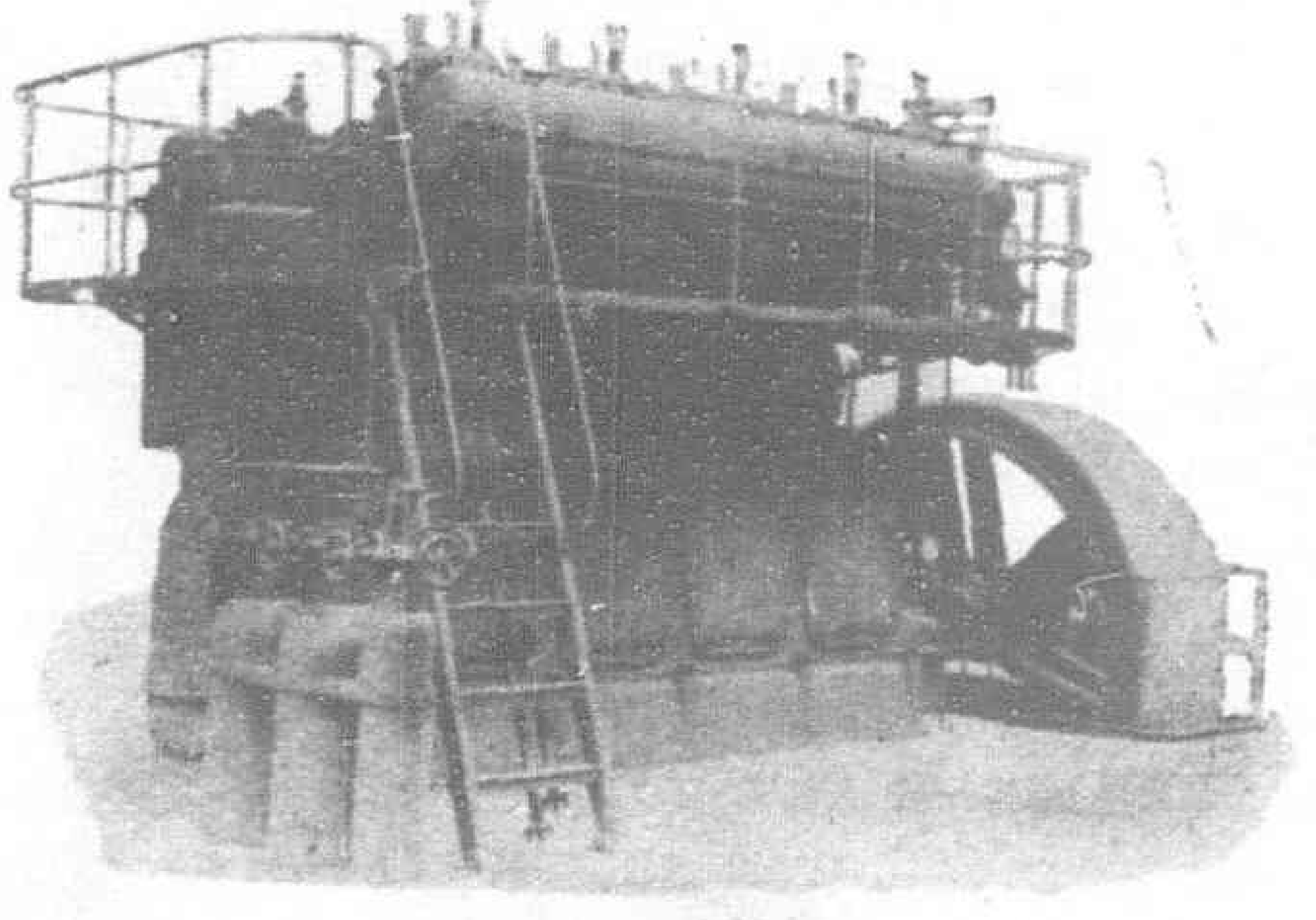
AGENTS FOR CHINA:

Andersen, Meyer & Co., Ltd., Shanghai

SULZER BROTHERS

SHANGHAI ENGINEERING OFFICE

No. 4 AVE. EDWARD VII



200 H.P. Diesel Engine

Uniflow Steam Engines, Upright Watertube Boilers, High and Lowlift Centrifugal Pumps, Fans and Ventilators for all purposes, Fire Engines, STATIONARY DIESEL ENGINES, Direct Reversible Diesel Marine Engines, Ice and Refrigerating Plants, Electro-Boilers, Maag Gear Machines.

目錄及關於工業上之問答等請直接本公司

蘇爾壽

工程事務所

上海愛多亞路四號

WINTERTHUR. SWITZERLAND.